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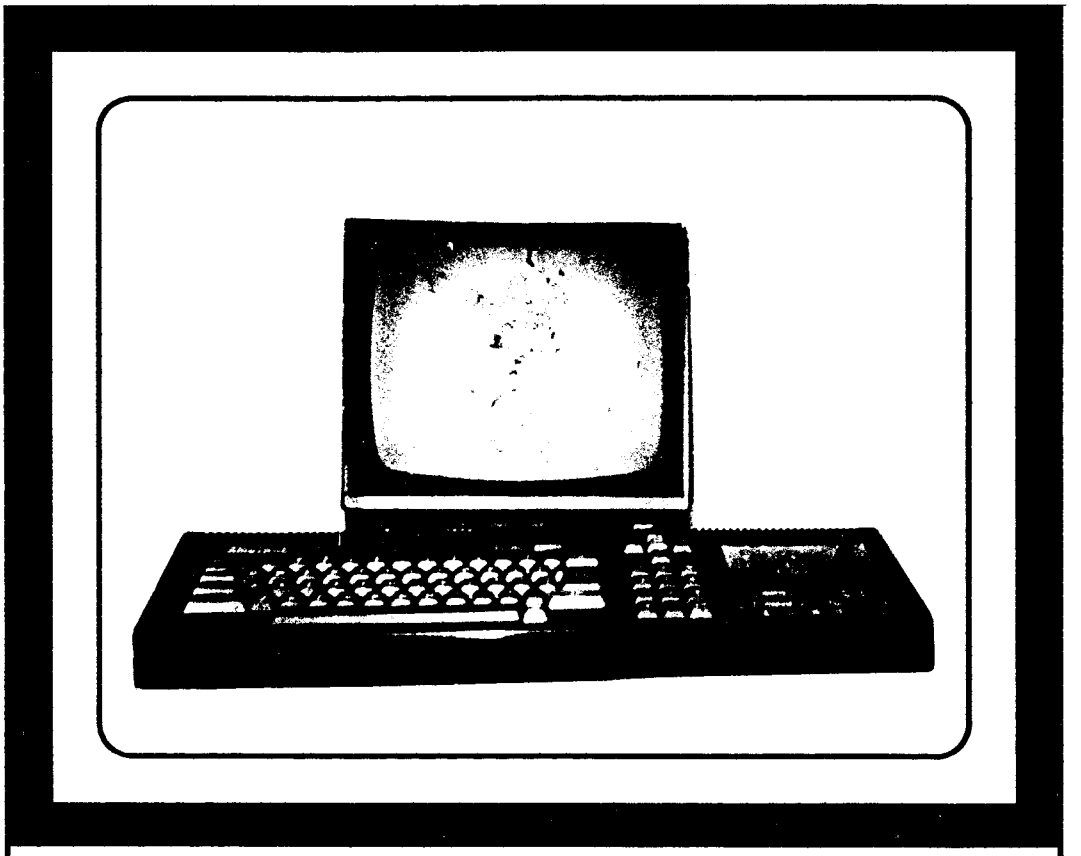
PRINT-OUT

ISSUE TWELVE



Written by Thomas Defoe and Mark Gearing
Contributors: Bob Taylor, Chris Williams, John Hudson,
Stefan Kuhs and M Graham

Including:

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...and the end of all the regulars

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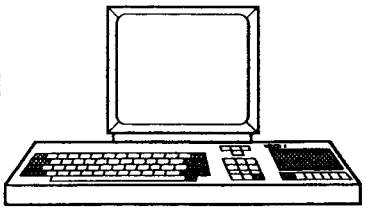


Welcome to Issue Twelve of Print-Out!!!

This issue's editorial is going to read like one huge thank you list. To begin with, I would again like to express my gratitude to everyone who has contributed to this issue; namely Mark Gearing, Chris Williams, John Hudson, Mr M Graham, Stefan Kuhs and Bob Taylor (what he doesn't know about computing isn't worth knowing!)

Next on my list of people who deserve a mention are all those who run fanzines, PD libraries and software companies — their help in telling people about the end of Print-Out has been invaluable; so here we go: Carl Surry (Playmates), Clive Bellaby (WACCI), Adam Shade (Dartsma PD), Debby Howard (Adventure PD), James Verity (CPC Network), Tony Kingsmill (Data PD), Alan Scully (Scull PD) and anyone else who I have accidentally missed off this list.

It was wonderful that so many readers wrote in following Issue Eleven, and on behalf of the whole Print-Out team I would like to express our gratitude for your very kind comments about the magazine — it is great to know that people have actually enjoyed Print-Out. Unfortunately, it was not possible to answer all of these letters personally, but please accept our sincerest thanks through this column.

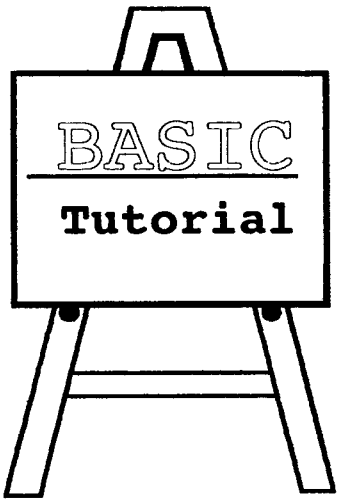
Just one important date to put in your diary and that is the 15th August; after this date you will no longer be able to order back issues and program tapes or discs from the us. Please note that we only have a limited number of certain items, so order quickly.

Remember if you have a question about any computer-related topic, you can write to us at the address shown below — we'll endeavour to answer all problems that we receive as fully as possible, providing we receive them before the 15th August.

Print-Out, 8 Maze Green Road,
Bishop's Stortford,
Herts CM23 2PJ.

Appeal on behalf of Cancer Research

Over the past few years, I have been collecting all the stamps from the envelopes that you have sent Print-Out and giving them to Cancer Research through a friend of mine -- Cancer Research are then given money depending on the weight of the stamps sent. As I'm no longer producing Print-Out, she asked whether all the readers could collect their used stamps and send them to her at this address: Mrs Audrey Reed, Kingshill, 149 Rye Street, Bishop's Stortford, Hertfordshire CM23 2HE (you don't need to cut out the stamps, just tear them off the envelopes)



Beginner's BASIC

Way back in Issue One, we started off this tutorial by having a look at the PRINT command. Now, to round off the series, we have come full-circle and are once again back with our old friend, PRINT. This time it is going to have yet another form, namely PRINT USING. The more you program in BASIC, the more you will find yourself wanting to print neatly aligned tables of results, and so on. This is where PRINT USING comes into play — with a bit of care you can set out tables of numbers, names, or anything else, and ensure that they all line up correctly.

However, in order to complete our look at the PRINT command in general, we need to briefly consider a couple of other commands which are associated with it. As you should be able to see, the PRINT instruction comes in many different forms and is not nearly as simple as it may have seemed originally!!

Defining a PRINT ZONE

First here is a brief summary of a couple of other commands which people have written in to ask about. From previous issues, you will be familiar with the result of the following line:

```
PRINT "All","the","words","are","now","spread","out","!!!!"
```

Each of the words is printed at the start of a new 'print zone'. When switched on, the CPC has a default print zone length of thirteen characters — this means that the first letter of each word is printed exactly thirteen characters after the first letter of the previous letter (you should be able to check this with the line above). You will notice that if a word cannot fit on a particular screen line, that word is moved to the start of the following line. If any print section is longer than the current print zone, then all the remaining words are shuffled along one print zone. Try the following as an example:

```
PRINT "All","the words are now","spread","out","!!!!"
```

The print zone length can be varied to be any length between 1 and 255 by using the ZONE command. The following line illustrates its use:

```
ZONE 7:PRINT "All","the","words","are","now","spread","out","!!!!"
```

Using the WIDTH command

Having recently received a letter from Stan Gardner of Stratford, I realised that we hadn't looked at the WIDTH command yet, so now is as good a time as any!

'I have just purchased my first printer (a Star LC24-200) and am puzzled by the printer being apparently unable to print more than 132 characters in a line when I list my type-ins to it (using LIST #8). After 232 characters it starts another line. Another one of your members tells me he has the same problem with his Star LC24-10. I have tried changing fonts and margins to no avail. I cannot find any printer control command which would rectify this. Surely it should be possible to print up to 256 characters?'

Fortunately there is nothing wrong with your printer and the problem you mention occurs with most printers. The fault lies with the CPC and, more specifically, in the WIDTH command. The purpose of this command is to tell the computer how 'wide' the printer is in terms of characters, so that BASIC can insert carriage returns at the appropriate positions — this is meant to ensure that a program line does not run off the side of the piece of paper. In the case of most modern printers, they have a different width to that which BASIC is expecting.

There are two ways round this problem, and which one is best will depend on the printer you are using. Most obviously you could alter the WIDTH setting to one that suits your printer, often around 80 characters — the default is 132 characters.

The second solution is only for printers which either set their own margins, or allow the user to set them. It is then possible to set the margins up on your printer, and then set the WIDTH to 255 characters, which is the maximum length of a BASIC program line. The CPC no longer inserts the carriage returns and it is left to the printer to decide when it has reached a margin. The advantage of this second method is that it will still work even if you change the type style or size (eg from condensed pica to expanded elite).

If you are using the first method, then you will need to change the value in the WIDTH command to suit the number of characters that the printer can fit onto a line in the current style.

Tables (and other things) with PRINT USING

Now on with the show! PRINT USING is really just a way of ensuring that every item that you print is lined up or laid out in some particular way. Primarily it is concerned with numbers, in which plus or minus signs are needed or where the number of decimal places needs to be limited. However, it also works for strings and text — more of which later. The full PRINT command is defined as follows:

```
PRINT [<#stream expression,>][<print list>][<USING clause>][<separator>]
```

What does all of that mean? The 'stream expression' bit was explained last issue when Tony Kingsmill looked at windows. The 'print list' is a fancy way of saying 'whatever it is you want to print'; it could be a piece of text in speech marks, a number, or a variable. Of course it is possible to have more than one item in the print list, such as in the following example:

```
PRINT "The number is";num
```

Here, both the text and the variable num$ are print items in the print list and are joined by the semi-colon (which is known as a separator) and this tells the CPC what to do with the next print item.

The two basic print separators are the semi-colon and the comma. The semi-colon lets the computer know that it is meant to continue printing on the same line. On the other hand, the comma tells the CPC to print at the next print zone — we've already seen an example earlier in this article.

Printed below is an example program which asks for a price and then calculates the price inclusive of VAT. When you run the program, the value including VAT is printed in full — obviously it makes no sense to print prices with more than two decimal places as you cannot get 0.75 pence! The replacement line 40 solves this problem with the USING command.

```
10 REM Program to calculate VAT on an item
20 INPUT "Please enter the price of the item exc VAT: ",price
30 vat=price*1.175
40 PRINT "The price including VAT is";vat
50 GOTO 10

40 PRINT "The price including VAT is ";USING "####.##";vat
```

In the above example, the USING clause is used to define the number of decimal places that can be displayed. The computer automatically rounds the number up or down depending on its value — ie 18.565 will be rounded up to 18.57. The bit that is in quotes after USING defines how the variable after that (ie the variable vat) will be printed. The character '#' stands for any number. However, notice what happens if the number before the decimal point is so large that it cannot fit into only four digits. The per cent (%) sign which appears is BASIC's way of showing that it has had to insert an extra leading digit in order for the number to make sense.

Long Numbers

On a similar theme, it is possible to insert commas into a number so that it is printed with the digits split into groups of three. For example, the number 123456789 is often printed as 123,456,789 to make it easier to see its value. This is achieved by the short program below which asks for large whole numbers and then adds them together and prints the total. The advantage of the USING command is that it can handle both long and short numbers automatically. Try giving the program numbers such as 1000000, 1234 and 678564. The entire printing routine is included in lines 30 and 50. It is very easy to change the number of digits that are displayed and their format.

```
10 REM Program to add up large numbers
20 INPUT "Please enter a number to add (enter 0 to end the data entry): ",num
30 IF num=0 THEN PRINT "The grand total is:   ";USING "###,###,###";total:END
40 total=total+num
50 PRINT "The current total is: ";USING "###,###,###";total
60 GOTO 10
```

There are many other ways of using PRINT USING in your own programs and is a very flexible command. The following listing should illustrate all of the results which USING can produce. Change the values in lines 10 and 110 and see the effects.

```
 10 num=1234.5678
 20 PRINT num
 30 PRINT USING "####.#####";num
 40 PRINT USING "+####.#####";num
 50 PRINT USING "####.#####+";num
 60 PRINT USING "**####.#####";num
 70 PRINT USING "$$####.#####";num
 80 PRINT USING "**$####.#####";num
 90 PRINT USING "#,###.#####";num
100 PRINT USING "#,##^^^^";num
110 text$="Hello out there"
120 PRINT USING "!";text$
130 PRINT USING "\     \";text$
140 PRINT USING "&";text$
```

NIRVANA by Goldmark Systems

Nirvana, from Goldmark Systems, is billed as the ultimate disc management suite, but does it live up to this claim? Nirvana certainly appears to offer everything that you would expect from a disc management program; once the initial title screen has loaded you are presented with a number of options: file management, directory editor, disc mapper, sector editor, and disc and file archiving.

For the majority of people, the first part of the program will be the one that is used most frequently. The file management section includes all of the standard features, such as disc and file copying, formatting discs and changing drives. Nirvana's real advantage over some other programs, is its ability to act on groups of files — you are able to select files using the cursor keys, and then copy or erase all of the files that have been highlighted; this feature proved to be invaluable. A further bonus when using Nirvana is that all options are selected via a couple of key presses, and this certainly makes life simpler. The disc and file copying facilities are well handled and I experienced no problems when copying discs (and even some commercial discs succumbed to it!) Nirvana will make use of any extra memory that you may have installed, upto 256K, and so it is possible to copy a 3" disc in one pass with 256K fitted.

The directory editor allows you to view the names of the files on the disc, and change the names and the file attributes — system, directory, read only, read write — and also to unerase files. The disc mapper lists where the files are stored on the disc (programs are not saved sequentially onto a disc) in terms of tracks and sectors. It is then possible to use the sector editor to alter programs or data on the disc; data is displayed in both hexadecimal and ASCII and the information stored on this part of the disc can then be changed, and the altered section resaved to the disc. Whilst all of these options are useful to programmers (and those who just enjoy tinkering about with their computer) they are probably of limited use to those who really want to only use their CPC, and so it is worth considering how much you need these facilities.

There are also options to archive both complete discs and individual files to tape (although these will not work on a 6128 Plus for obvious reasons). It takes about fifteen minutes to archive a side of disc to tape, and the same length of time to restore an archive to disc — which is a small price to pay, bearing in mind the price of discs!

All in all, Nirvana is a very nice package and, whilst one or two options are perhaps not quite as versatile as they might have been, any slight problems can easily be worked around — if any future versions are planned it would be helpful to include a facility for making multiple copies of a disc, without having to reload the source disc each time. Minor glitches aside, it makes a worthwhile addition to any disc user's collection. Nirvana costs £15 on disc and is available from Goldmark Systems, 51 Comet Road, Hatfield, Herts AL10 0SY or give them a ring on (0707) 271529.

THE PRINT-OUT FIRMWARE GUIDE

Do want to know what's inside your computer's memory ?
Do you want to be able to push your CPC or Plus to its limit ?
Are you interested in programming software, rather than using it ?
If so, then you need this essential guide to your CPC.....

Written by the authors of Print-Out, this professionally produced guide contains over 80 pages of information about the 'insides' of your computer. It includes:

- a memory map containing detailed descriptions of every memory location's purpose
- a complete list and description of all of the firmware calls and indirections
- the 'undocumented' maths firmware routines
- a list of the entire Z80 instruction set, including the illegal commands
- a chart for easy conversion of decimal-binary-hexadecimal numbers
- the disc and tape systems explained, and their firmware calls
- a selection of routines to make your programming quick and simple
- 6128 to 464 memory address conversion chart

To get the most from this guide, we can also provide a tape or disc with several routines for simple programming in Machine Code. This includes a memory editor, full-featured assembler, ROM enabler and disabler, and software to allow you to use the firmware from BASIC.

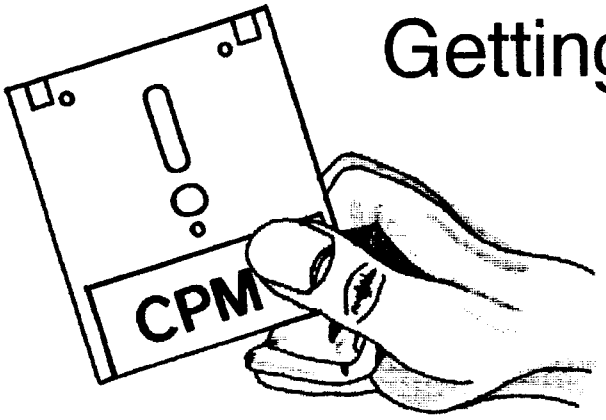
These products are available only from Print-Out at the following prices:

The Firmware Guide	.....	**£4.50**
The Firmware Guide + tape	.....	**£6.75**
The Firmware Guide + disc	.....	**£8.75**

It has been several years since Amstrad discontinued production of the 'official' firmware manual. Not until now has there been a publication with similar information; the Print-Out Firmware Guide has been built up over years of computer programming and the authors' knowledge and expertise has been brought together in *the* guide for all serious users.

If you would like to order a copy, please send your cheque or postal order made payable to Print-Out to the address shown below. The Firmware Guide will be released on the 14th April, but if you wish you may reserve your copy in advance — please send full payment with your order.

PRINT-OUT, 8 Maze Green Road,
Bishop's Stortford, Herts CM23 2PJ



Getting to Grips with CPM

Introducing the system: Part 6

by CHRIS WILLIAMS

Welcome to the final instalment on using CPM. I would like to point out that the Z80 and 8080 conversion chart came from a very old issue of the best Amstrad magazine ever, Computing with the Amstrad (hang on a minute — Tom!)

As promised, we'll now make a COMmand file. If you have a Z80 assembler, you will be able to use normal Z80 mnemonics, otherwise you'll need to use the assembler which comes on your system disc. Unfortunately, it only assembles 8080 mnemonics (see fig 3 for Z80 to 8080 code conversion). It is called ASM.COM.

Some assemblers create their own COM files, so it all depends on which one you are using. MAXAM II which runs under CPM Plus could be used — when assembled the COM file is simply copied to a CPM 2.2 disc. I haven't come across a usable text editor, so we will have to use ED.COM. We will need to copy some files to your work disc and these are: ASM.COM, ED.COM and LOAD.COM.

Type at the CCP: `ED test.asm` (don't forget the file extension)

When the '*' prompt appears, type 'i' to insert the code but don't bother with the comments; the code is shown in fig 1, and is repeated in fig 2 using Z80 mnemonics so you can enter it into a Z80 assembler if you have one.

If you make a mistake entering the code, type [CTRL]+H to remove the last character typed. Press [RETURN] at the end of each line. When all the code has been entered, press [CTRL]+Z and this returns you to the '*'.

Now type 'e' and your file will be saved to disc. We now need to assemble this file — type ASM TEST (do not use a file extension or it may crash!) All being well, this should appear:

```
CP/M ASSEMBLER-VER 2.0
012F
000H USE FACTOR
END OF ASSEMBLY
```

Two files will be created — TEST.PRN and TEST.HEX — but we need bother only with the latter. Now type LOAD TEST.HEX (don't forget to include the file extension). Again, if all goes according to plan, this will appear:

```
FIRST ADDRESS     0100
LAST ADDRESS      012E
BYTES READ        002F
RECORDS WRITTEN   01
```

After the disc has finished whirring, type DIR and you will see that a file called TEST.COM has been created. So now type TEST without a file extension and 'Hey Presto!' — the string has in the code should be printed and a beep will be heard. That is how to create a COM file, but how to program one?!

FIGURE ONE (8080 version)

```
org 256          ; start address
mvi e,7          ; E holds control code 7
mvi c,2          ; C holds function number 2
call 5           ; call the BDOS
lxi d,str        ; D points to the string
mvi c,9          ; C holds function number 9
call 5           ; call the BDOS
ret              ; return back to CPM
str db 'Your text$'
```

FIGURE TWO (Z80 version)

```
org &100
ld e,7
ld c,2
call 5
ld de,str
ld c,9
call 5
ret
str defm "a bit of text$"
```

the $ sign tells function 9 that the end of the string has been reached

Simple CPM Programming.....

.....and simple programming it will be!!! When you write programs to run under CPM you have to assemble them to the address &100. You can use anywhere in CPM's TPA but the first three bytes (located from &100) must point to the start address of your code (see below). This is because when a COM file is run, CPM passes control over to address &100.

```
org &100
call start
org &4000
start ld e,7
ld c,2
call 5
ret
```

Take a look at figure 2 on the previous page — you can see that by loading the C register with the desired function number, and register DE with address of a pointer or buffer, you can call BDOS (address 5) to perform the required function. You ought to sit down and experiment as much as possible. Use only copies of your work discs and everything should be okay.

CPM programming really warrants a tutorial on its own — I can't go into it too much here because I am far too inexperienced in writing CPM programs. If you are fairly good at machine code and really good at BASIC, then you should be able to program in CPM.

Understanding PIP.COM

While you are waiting for your copy of NEWSWEEP (which you should have ordered by now!), you will need to use something else. FILECOPY is unreliable, so the next best thing is PIP.COM. It is, of course, a bit more complicated to use, but once learnt it will stand you in good stead.

It can be used for all types of file copying, renaming and printing and it can also be used as a crude test editor. The best way to learn how to use PIP.COM is to experiment on non-essential files and work discs (make the usual copies of work discs). PIP stands for Peripheral Interchange Program, and can be used to control all your hardware, such as your printer, disc drives, and even another computer!!! Generally it is used in forms such as these:

PIP b:=fred.com	copy 'FRED.COM' to drive B
PIP b:=a:*.*	copy all files from drive A to drive B
PIP b:=a:*.* [v]	verify all files to check if they have copied correctly
PIP b:=a:*.* [c]	prompt for confirmation to copy or not
PIP b:=a:*.* [Dn]	only copy up to the specified number of columns in the file
PIP b:=a:*.* [e]	echo all messages to screen (writing to drive B) — use only on text files
PIP b:=a:*.* [f]	removes all form feeds in a specified file
PIP b:=a:*.* [l]	converts all capital letters to lower case
PIP b:=a:*.* [u]	converts all lower case letters to capital letters
PIP b:=a:*.* [h]	characters are checked to see if they are hex, and an error message results if not
PIP b:=a:*.* [Pn]	sets page length — the default is 60
PIP b:=a:*.* [Qstring^Z]	a file will be copied until the specified string is encountered (but not the string itself) and then it is closed with an end of file marker (^Z)
PIP b:=a:*.* [r]	read-only system (SYS) files can be copied
PIP b:=a:*.* [Sstring^Z]	a file is copied from the first occurrence of the string (and the string is also copied)
PIP b:=a:*.* [x]	copies non-ASCII files (eg BASIC and binary)
PIP lst:=FILE.TXT[U P30 Qfred^Z]	note the position of the spaces; this will send the file FILE.TXT to the printer, inserting a form feed every 30 lines, and will end when the string 'fred' is reached
PIP newfile=file.1,file.2,file.3	merges files one, two and three and saves them as NEWFILE

If you have any problems with this, or any previous articles, then please feel free to write to me, enclosing an SAE, to: *Chris Williams, 6 Frank Street, Great Horton, Bradford BD7 3BT.* You can write to me about anything — I would like to hear from anybody who has a Plus model, because I am compiling a list of games that will not run on a new 464 Plus or 6128 Plus. Please enclose an SAE, and I will return it with an updated list.

Fig 3: Z80 Opcodes	8080 Opcodes
ADC A,nn	ACI nn
ADC A,(HL)	ADC M
ADC A,r	ADC r
ADD A,nn	ADI nn
ADD A,(HL)	ADD M
ADD A,r	ADD r
ADD HL,BC	DAD B
ADD HL,DE	DAD D
ADD HL,HL	DAD H
ADD HL,SP	DAD SP
AND nn	ANI nn
AND (HL)	ANA M
AND r	ANA r
CALL nnnn	CALL nnnn
CALL C,nnnn	CC nnnn
CALL M,nnnn	CM nnnn
CALL NC,nnnn	CNC nnnn
CALL NZ,nnnn	CNZ nnnn
CALL P,nnnn	CP nnnn
CALL PE,nnnn	CPE nnnn
CALL PO,nnnn	CPO nnnn
CALL Z,nnnn	CZ nnnn
CPL	CMA
CCF	CMC
CP (HL)	CMP M
CP nn	CPI nn
CP r	CMP r
DAA	DAA
DEC (HL)	DCR M
DEC r	DCR r
DEC BC	DCX B
DEC DE	DCX D
DEC HL	DCX H
DEC SP	DCX SP
DI	DI
EI	EI
EX DE,HL	XCHG
EX (SP),HL	XTHL
HALT	HLT
IN A,(nn)	IN nn
INC (HL)	INR M
INC r	INR r
INC BC	INX B
INC DE	INX D
INC HL	INX H
INC SP	INX SP
JP nnnn	JMP nnnn
JP C,nnnn	JC nnnn
JP M,nnnn	JM nnnn
JP NC,nnnn	JNC nnnn
JP NZ,nnnn	JNZ nnnn
JP P,nnnn	JP nnnn
JP PE,nnnn	JPE nnnn
JP PO,nnnn	JPO nnnn
JP Z,nnnn	JZ nnnn
JP (HL)	PCHL
LD A,(nnnn)	LDA nnnn
LD A,(BC)	LDAX B
LD A,(DE)	LDAX D

Z80 Opcodes	8080 Opcodes
LD HL,(nnnn)	LHLD nnnn
LD BC,nnnn	LXI B,nnnn
LD DE,nnnn	LXI D,nnnn
LD HL,nnnn	LXI H,nnnn
LD SP,nnnn	LXI SP,nnnn
LD (HL),r	MOV M,r
LD r,(HL)	MOV r,M
LD r,r2	MOV r,r2
LD (HL),nn	MVI M,nn
LD (nnnn),A	STA nnnn
LD (BC),A	STAX B
LD (DE),A	STAX D
LD (nnnn),HL	SHLD nnnn
LD SP,HL	SPHL
NOP	NOP
OR (HL)	ORA M
OR r	ORA r
OR nn	ORI nn
OUT (nn),A	OUT nn
POP AF	POP PSW
POP BC	POP B
POP DE	POP D
POP HL	POP H
PUSH AF	PUSH PSW
PUSH BC	PUSH B
PUSH DE	PUSH D
PUSH HL	PUSH H
RLA	RAL
RRA	RAR
RET	RET
RET C	RC
RET M	RM
RET NC	RNC
RET NZ	RNZ
RET P	RP
RET PE	RPE
RET PO	RPO
RET Z	RZ
RLCA	RLC
RRCA	RRC
RST 00	RST 0
RST 08	RST 1
RST 10	RST 2
RST 18	RST 3
RST 20	RST 4
RST 28	RST 5
RST 30	RST 6
RST 38	RST 7
SBC A,(HL)	SBB M
SBC A,nn	SBI nn
SBC A,r	SBB r
SCF	STC
SUB (HL)	SUB M
SUB r	SUB r
SUB nn	SUI nn
XOR (HL)	XRA M
XOR r	XRA r
XOR nn	XRI nn

r, r2 — 8 bit registers nn — a 1 byte number nnnn — a 2 byte number or address

TECHNICAL INFO.....TECHNICAL INFO.....TECHNICAL INFO...

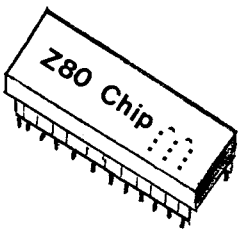
Printed below are some useful BDOS functions, along with their number, and their input and output parameters. The DMA is set to &80 by default

Function Name and Number	Input parameters	Returned value
0 SYSTEM RESET		
1 Console Input		A=character
2 Console Output	E=character	A=&00
3 Auxiliary Input		A=character
4 Auxiliary Output	E=character	A=&00
5 List Output	E=character	A=&00
6 Direct Console I/0	E=&FF/&FE/&FD/char	A=character/status/-
7 Auxiliary Input Status		A=&00/&FF
8 Auxiliary Output Status		A=&00/&FF
9 Print String	DE=(string)	A=&00
10 Read Console Buffer	DE=(buffer)	characters in the buffer
11 Get Console Status		A=&00/&01
12 Return Version Number		HL=version
13 Reset Disc System		A=&00
14 Select Disc	E=disc number	A=error flag
15 Open File	DE=(FCB)	A=dir code
16 Close File	DE=(FCB)	A=dir code
17 Search for First	DE=(FCB)	A=dir code
18 Search for Next		A=dir code
19 Delete File	DE=(FCB)	A=dir code
20 Read Sequential	DE=(FCB)	A=dir code
21 Write Sequential	DE=(FCB)	A=dir code
22 Make File	DE=(FCB)	A=dir code
23 Rename File	DE=(FCB)	A=dir code
25 Return Current Disc		A=current disc number
26 Set DMA Address	DE=(DMA)	A=&00
32 Set/Get User Code	E=&FF/user number	A=current user/&00
33 Read Random	DE=(FCB)	A=error code
34 Write Random	DE=(FCB)	A=error code
35 Compute File Size	DE=(FCB)	r0,r1,r2 A=error flag
37 Reset Drive	DE=drive vector	A=&00
44 Set Multi-Sector Count	E=number of sectors	A=return code
152 Parse Filename	DE=(PFCB)	See below

FCB stands for File Control Block and it must be set up for each file operation. There are two ways of doing this, but the simplest is by using BDOS function 152, Parse Filename; this requires DE to point to a 4 byte block of memory defined as follows — the first two bytes should point to a string containing the filename, extension and any drive prefix. The string must be terminated by a byte of &00; the second two bytes should point to the address at which you want the FCB to be put. The FCB area should be 36 bytes long.

The second article on CPM — 'DISC FORMATS' by John Hudson — is printed on page 26

PROGRAMMING THE Z80



THE PARITY AND THE OVERFLOW FLAG

This particular flag occupies bit 2 of the Flags register (the register which is often thought of as accompanying the A register: for example as in PUSH AF). It has a dual purpose, its contents being taken as representing Overflow when resulting from Two's complement arithmetic, and Parity when resulting from manipulation of bits within a register.

OVERFLOW

We normally think of this occurring when we add two bytes together and the result is larger than a byte can hold. The overflow which the flag represents is a little more involved than this as it applies to Two's complement arithmetic. This is a system whereby the values which a byte can hold are considered as running from -128 (&7F), instead of the normal 0 (&00) to 255 (&FF). In mathematics, values are not just positive, so Two's complement allows negative numbers to be expressed in a single value without having to add a separate minus sign (which could get lost).

With Two's complement values, bit 7 set indicates a negative value (this bit is called the sign bit as it indicates the sign of the value and isn't part of the value proper). Having gained this advantage, there is a price to pay in machine code where addition and subtraction using certain values will give the wrong answers:

Consider:	&0C + &5A = &66	or in decimal:	12 + 90 = 102	which is correct
but:	&6A + &32 = &9C	or in decimal:	106 + 50 = –100	which is wrong

In the latter case, the Overflow flag would be set to indicate that the result is incorrect and needs adjusting: the programmer is expected to test the flag and if set, to reset bit 7 of the result and in theory, pass a 'carry' to show that there has been normal overflow (as opposed to Two's complement overflow):

Addition:	&9C – &80 = &1C + 'carry'	or in decimal:	28 + 128 = 156	
Subtraction:	&83 – &14 = &6F	or in decimal:	–125 – 20 = 111	which is wrong

Again the Overflow flag will be set, and this result will need to have bit 7 set, and a 'borrow' taken:

Subtraction:	&6F + &80 = &EF – 'borrow'	or in decimal:	–17 – 128 = –145	which is correct

Two byte values (and even four byte values) can also be Two's complement numbers; with these, it is only bit 7 of the most significant byte which is used as the sign bit. There are two other occasions when the Overflow flag could be set. An INC instruction will do so if the result is &80, and similarly a DEC command will if the result is &7F. This is just an extension of the concept of Two's complement overflow to these instructions.

PARITY

This term is used to indicate that a register has an even number of bits set (or none) as result of a shift, rotate, or logical (OR, AND and XOR) instruction. The parity bit of the flag registers is set when there are an even number of bits set; note from the following examples, that this does not depend on the evenness of the number in the register:

value: &00	bit sequence: &X00000000	parity: even	parity flag: set
value: &01	bit sequence: &X00000001	parity: odd	parity flag: clear
value: &02	bit sequence: &X00000010	parity: odd	parity flag: clear
value: &03	bit sequence: &X00000011	parity: even	parity flag: set

Note also, that if there is an even number of bits set, then there are also an even number of bits not set. There are conditional JP, CALL and RET instructions which are affected by the status of the Parity/Overflow flag as follows:

JP PO,address or CALL PO,address or RET PO	(where PO means Parity Odd)
JP PE,address or CALL PE,address or RET PE	(where PE means Parity Even)

Please note that the routines printed below are not complete routines and so must be incorporated into your own programs. Because of this, I have not included detailed instructions on what each command does, but have given an overview of how the routines works. For details of exactly what the shift and rotate instructions do to registers, please consult the relevant article in the previous issue.

In that issue, the principle behind using the shift and rotate instructions to multiply two numbers together was briefly explained. When multiplying (by two), the least significant byte of the value needs bit 0 filled with a zero (for example, &X01 * 2 = &X10 which in decimal is written as 1 * 2 = 2). This can be achieved by use of the SLA (shift left arithmetical) instruction. The example routine below will multiply the number in DE by 11.

```
        LD DE,129     ; DE=&X00000000,10000001
        LD B,D
        LD C,E        ; make a copy of DE
.double SLA E         ; double the value of E and fill its bit 0 with a zero
        RLA D         ; double the value of D also, rotating in any Carry from the doubling of E
                      ; DE=&X00000001,00000010 (=258 decimal)
        SLA E         ; again double the value of E and fill its bit 0 with zero again
        RLA D         ; do the same as before, DE=&X00000010,00000100 (=516 decimal)
        LD A,E        ; load the value in E into the A register
        ADD A,C       ; add the low byte of the original value into the present low byte
        LD E,A        ;  and store it in the E register
        LD A,D        ; load the value in D into the A register
        ADC A,B       : add the high byte of the original value (plus any Carry) into the present high byte
        LD D,A        ;  and store it in the D register
                      ; DE now holds &X00000010,10000101 (516+129=645 ie times by 5)
        SLA E         ; see the point labelled double above
        RLA D         ; DE holds &X00000101,00001010 (=1290 decimal ie times by 10)
        LD A,E        ; load the value in E into the A register
        ADD A,C       ; add the low byte of the original into the present low byte
        LD E,A        ;  and store the value in the E register
        LD A,D        ; load the value in D into the A register
        ADC A,B       ; similarly add the high byte of the original (plus any Carry) into the present high byte
        LD D,A        ;  and again store the value in the D register
                      ;  and now DE=&X00000101,10001011 (=1419 decimal ie times by 11)
```

As can be seen, the heart of the above routine is just a sequence of SLA E plus RLA D to do the doubling, with 'adding' sections using the A register (note that when multiplying, the low byte is handled first). It may seem a long winded way to do what could be achieved by using instead:

```
        LD HL,129     ; HL holds 129
        LD B,H        ; load B with the value in H
        LD C,L        ; load C with the value in L
        ADD HL,HL     ; double the value in HL, HL now holds 258
        ADD HL,HL     ; double the new value in HL, HL now holds 516
        ADD HL,BC     ; add the original value to the current value in HL, HL holds 645
        ADD HL,HL     ; again double the new value in HL, HL holds 1290
        ADD HL,BC     ; finally add in the original value of HL so that it now holds 1419 (ie 129*11)
```

However, the first routine shows the method to be applied if the HL pair is not available, or if the value is contained in more than two registers. If the latter is the case, then you would need to insert extra instructions in the "SLA Reg plus RLA Reg' and 'adding' sequences as required.

When we are considering signed multiplication, there are a number of important points to bear in mind — these are described later in this article, after the sections on signed and unsigned division.

When dividing things seem a little different. If you need to divide an unsigned number by 2 (by shifting the value to the right) then the most significant bit needs to be filled with a zero to provide the correct result, and this can be achieved by use of the SRL (shift right logical) instruction. For example:

in decimal: 128 / 2 = 64 in binary: &X10000000 / 2 = &X01000000

However, signed arithmetic treats the most significant bit (ie bit 7 of the most significant byte) as a sign bit and not as part of the value; if this bit is set, then the value is regarded as being negative, and if reset, it is positive. Obviously if a negative number is divided by two, then the result must also stay negative. To keep the negative sign, the most significant bit needs to be refilled with a 1. For example:

in decimal: (–64) / 2 = –32 in binary: &X11000000 / 2 = &X10100000

On the other hand, a positive number divided by two should stay positive. In this case, the most significant bit should contain zero. As shown below:

in decimal: 64 / 2 = 32 in binary: &X01000000 / 2 = &X0010000

These two different requirements could be achieved by testing the result somehow, and then inserting the correct bit, but a simpler way would be to keep the setting of bit 7 as it was. The SRA (shift right arithmetical) instruction does this automatically. The following piece of code illustrates how a signed number may be divided by 2:

```
LD DE,–1290  ; DE holds &X10000101,00001010
SRA D        ; D now holds &X10000010 plus a Carry
RRA E        ; the bits are moved to the right, and the Carry from the instruction above is put into bit 7
             ;  of the E register, so that E now holds &X10000101
             ;  DE now holds &X10000010,10000101 (= –645 in decimal)
```

The above routine is also capable of dealing with signed division of positive numbers. Note that the high byte is always handled first with division. Unlike the multiplication routine above, there is no quicker method available for division.

SIGNED MULTIPLICATION

Whilst considering signed arithmetic, it is worth briefly looking at how signed numbers could be multiplied together. This will also require the sign bit to be maintained during the doubling operation, but unfortunately there is no shift left instruction available and so a long hand method will need to be used. Part of a routine to achieve this is printed below:

```
         LD DE,–645  ; DE holds &X10000010,10000101
         BIT 7,D     ; check bit 7 of the D register (ie the sign bit)
         PUSH AF     ; push the result of this check onto the stack — if bit 7 was set (ie the number was negative)
                     ;  then the zero flag will not be set
         SLA E       ; E now holds &X00001010 plus a Carry
         RLA D       ; the bits are moved to the right, and the Carry from the instruction above is put into bit 0
                     ;  of the D register, so that D now holds &X00000101
         POP AF      ; the result of the check on the sign of the original number is taken off the stack
         JR Z,notneg ; if the original value was positive, then the routine jumps to notneg
         SET 7,D     ;  otherwise the most significant bit is filled with a one, to make the result negative
.notneg              ;  the rest of the routine now follows
```

The multi-register rotate and shift instructions affect all of the flags, including the Zero flag, and so it was necessary to PUSH the result of the check on bit 7 of the D register, whilst the SLA and RLA instructions were being used. When the result is POPped off the stack, it is then used to determine whether the sign bit needs setting again to keep a negative value.

And that rounds off this Machine Code tutorial — happy coding!!!

Talisman of Lost Souls

This is Tony's eighth adventure game and, as usual, is written using Quill and Illustrator. Talisman of Lost Souls was originally released during the summer of last year, but since then the price has been reduced to £4.25 and it has become disc only.

As with all of Tony's adventures the program is well packaged and it comes with brief printed instructions on how to play.

Upon running the disc you are given the full story behind your quest: a group of evil villains with magical powers have plundered the rich village of Katwelge and stolen its many priceless treasures. During this raid, the inhabitants of the village were turned to stone forever. The only way this spell can be reversed is with the powerful Talisman which, according to legend, is looked after by an old magician, Zorcon. Many adventurers have searched for the Talisman of Lost Souls, but few have ever found it; and those that did have been destroyed by Zorcon as they were not considered worthy.

The loading screen is a text-only affair. For a game that claims to have been playtested, I found it unbelievable that there should be an elementary error in the loading program. It was easily avoided but is shouldn't have been in the game at all. Having loaded the main program, I was able to get started.

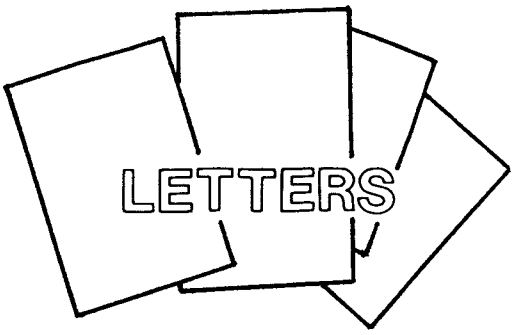
All of the standard adventure commands are supported, as well as a few more. The parser was reasonably fast (although it seemed to be limited to VERB and NOUN instructions. A brief word of advice to all homebrew writers; as the parsers used by adventure creators, such as Quill and GAC, are far more limited in the words they can understand than a professional adventure game, it makes sense to provide a list of those verbs which can be used in the game.

The location descriptions in all of Tony's games are full and imaginative, and Talisman of Lost Souls was no exception. However, there was a lack of atmosphere or tension in the game, and there seemed no real urgency in completing the task. Despite there being a fair number of locations, there was only a few pictures to brighten up the game — however, the graphics were much better than in many homebrew adventures.

There were a large number of puzzles in the game, most of which involved examining everything until you found a useful item. In other cases, there were virtually no clues in the game as to what you should do to solve a puzzle. There were, however, a few puzzles that were both logical and innovative. It also included very limited (as Tony himself admitted) character interaction, but it all added to the game. The style of the puzzles and the number of locations meant that it was not too challenging and was easily completed with just a little bit of thought.

Talisman of Lost Souls is a competent adventure in the style of most Quill games — it was enjoyable and worth playing if you are keen on adventures, but did not contain any real innovations that set it apart from any other games of this type.

Talisman of Lost Souls by Tony Kingsmill — price £4.25 on disc only
Order from: 202 Park Street Lane, Park Street, St Albans, Hertfordshire AL2 2AQ



Thank you for all your letters — they have been very much appreciated and we are glad to know that people have enjoyed the magazine.

Goodbye to Print-Out

It is a great pity when something of excellence — such as Print-Out — becomes no longer available. It seems that we are no longer a nation of craftsmen and are only interested in junk!

Thank goodness I have all the back issues and can truly say that I have learnt more about my 464 in the last few months than from other sources since I bought it in 1985!

Mr D S ANTHES
BRIDPORT

Top of the Pops

How very sorry I am to hear of the demise of Print-Out. I thought I was a good BASIC programmer before I subscribed to Issue One two years ago, but you've taught me so many things I didn't even know existed. It really is a sad loss to the CPC community as, without being biassed in any way, Print-Out stands supreme amongst the CPC fanzines. This isn't just my personal opinion as the letter pages of the others say the same thing. You are Number One.

I'm at a loss for words. You're very clever young people and I'm sure you will both go far in your respective careers, all the best!

BARRIE SNELL
ROCHESTER

Simply the best...

...I must say that I am extremely sorry to hear that Print-Out is coming to an end, I'm sure that all your readers would be happy to pay a little extra, but I suppose the problems aren't quite as simple as that. To speak bluntly, it's the best damn magazine for the CPCs and there simply isn't another like it — that's not flattery, simply the truth. So when you go, it's back to comic type magazines and half-witted advice, a very depressing prospect...

Mr M GRAHAM
DINGWALL

PRINT-OUT: Unfortunately, the problem isn't a matter of money at all — in fact the magazine costs relatively little to produce (although the postage is a bit expensive). The real reason is the lack of time, both myself and mark have got our A-levels coming up in the next year; in addition there are important exams during the coming months and work experience during the holidays. We felt that we were not able to offer a reliable service and knew that magazine release dates would be even more delayed than usual.

French shortages

I'm sorry to have been so long in thanking you for your kindness in sending my SHADDUMP disc. The very day the disc arrived, my disc drive failed and I had to send it for repairs. The vendor took my 300 francs and eventually said he could do nothing for lack of spare parts...and kept the 300 francs!!! I then phoned Amstrad who suggested a repair shop. After a few days (and no charge) I was told that Amstrad spares were unavailable in France and I ordered the mechanism from England and hope to receive it next week. I will then be able to use my Brunword and test your SHADDUMP — I will let you know how it works with me.

M PITOT de la BREAUJARDIERE
PARIS, FRANCE

PRINT-OUT: I'm rather alarmed by your letter — as according to Amstrad and other sources, France is one of the best markets for the CPC. Yet if Amstrad spares are drying up in France then it does sound as if Amstrad has finally lost all interest in the CPCs and Pluses. It is a well known fact that there are no more CPC or Plus bits of hardware rolling of the Amstrad production line, and supplies are rapidly disappearing. However, the CPCs have a thriving underground network (with lots of PD libraries and fanzines) and I think it will be several years before these groups leave the CPC — until then, the CPC user base will continue to support the computer.

Mail order worries

In the last issue of Print-Out (Issue Ten) you reported receiving many letters from disgruntled people who had been conned by mail order companies. Unfortunately for me, you did not name these companies, and I did not read your review of the RAMROM until I had sent an order to Microstyle. I sent an order to Microstyle on the 12th December last. My cheque was cleared to my bank account on the 13th January, but no goods have been received despite two reminders, the second of which was strongly worded. I sent an order to WAVE on the 18th January for ten 3 inch discs in individual plastic cases. Ten uncased discs in paper envelopes were delivered but there was no refund in respect of the considerable price difference. A letter to the proprietor, asking for an explanation and/or refund, has not been answered.

I am fed up with small firms which, at the least, are incompetent and, at the worst, are dishonest. The sooner we are fully integrated into the Common Market the better.

Mr A J SNOW
MARCH

PRINT-OUT: I too am fed up and have decided to print these two firms names as we have received more than a few complaints about them. It ought to be pointed out that I have used both firms in the past and found them to be satisfactory in sending out my orders. The best advice is to stick to a single company who you trust — my favourite is MJC Supplies who have been both helpful and reliable for years.

New Zealand calling...

I recently received a strange missive from someone in New Zealand — it appears to be some kind of newsletter but as there was no accompanying explanation, and no copyright on it, I thought I would print it in full and leave it up to you to try and decipher it. I've also included the address from which this unusual item was sent so that you can contact whoever is responsible for it. By the way, I think that 'Lord Saccharine' refers to 'Alan Sugar' — that's antipodean humour for you!

Programmer's plight: In 1987 Sir Clive Sinclair, not knowing what to do with the Spectrum sold it to Lord Saccharine. He didn't know what to do with it either. Now the once-might Spectrum lies silent and abandoned by all but a tiny handful of dedicated BASIC programmers (pause for violin). I doubt if there are now more than one in ten computer owners with the knowledge and skill to write a simple ten line BASIC or COBOL program.

Which word-processor? Tasword is essentially the standard Spectrum word-processor, the common-or-garden variety being tape-based or available on cartridge with the printer supporting Tascopy, Tassign etc. Some others are The Last Word, Writer and Spectext.

Acorn View is available as a ROM chip or cartridge, but shows its age badly; if you haven't a hyperdrive or similar ROM, forget it and get WordWise Plus, Starword (welcome back Slogger!) or Interword.

Peter Brunning's Brunword 6128 has been available on 3 inch disc since about 1988 and it's now ROM based with Infoscript d/b. B/W Elite and screen dumps for 9 and 24 pin printers, and there's room for an optional KDS ROMDOS, supporting direct access file just like the real machines!!! There is an incredibly powerful 256K of ROM based software fitted inside a 3x0.5x2.5 inch module. Now if only the Sam Coupé was like that (sigh!)

Work Wtd: Versatile ComputeResearch (NZ) unLtd, 'Have Database, will print'. SAE to the above address.

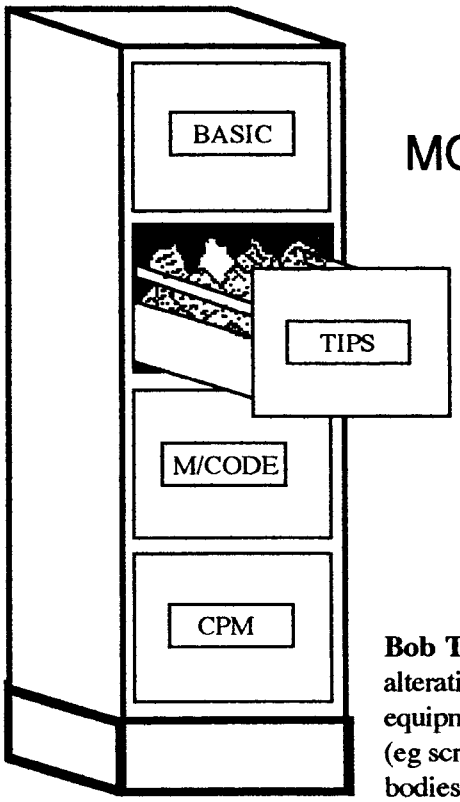
Next month: The Printer's Predicament

Some of the bits that I didn't understand at all have been removed — just what does 'sw i.f. m/d bks sep' mean? If you want to get in touch with the person in charge of this newsletter, then write to:

Versatile ComputeResearch (NZ) unLtd, 177/4 Shirley Road, Papatoetoe, New Zealand

COMPETITION WINNER...

The response to our competition to guess Bob Taylor's age was a little disappointing — although Bob says he found some of the answers rather flattering. The winner was Steve Lee from Ramsey; if his name sounds familiar, it may be because he also won a copy of Tearaway in our Issue Seven birthday giveaway — still that's the way it goes. Congratulations and your prize is on its way. If you want to know Bob's age, you'll have to read his profile elsewhere in this issue.



Technical Tips

MORE READERS QUERIES ANSWERED.....

by Bob Taylor

'Over the past seven weeks, seven of my discs have for a better name been polluted and I have not been able to get the programs out of the disc. In most cases, it is only one side that is affected. Could you let me know what causes this, if possible. I have taken all precautions against this, like keeping the discs away from the TV, radios and wires, and making sure I take the disc out before switching off. The discs cannot be used, even when I have reformatted them.'

Mr C PRESCOTT
MARPLE

Bob Taylor replies: Corruption of disc usually takes one of two forms. These are alteration of the data due to a magnetic source (eg TVs, monitors, loudspeakers or other equipment containing magnets) and physical disturbance of the disc's magnetic coating (eg scratches or digs due to exposure of the inner surface during handling, or to foreign bodies entering the disc case).

Physical disturbance causes the disc to be permanently faulty, while magnetism can have either temporary or permanent effects depending on the strength of the external magnetic field causing the corruption; a very strong field may magnetise the disc's magnetic material beyond the level which the disc drive head can alter.

I have a modest collection of fifty discs, built up during the last seven years. Of these, perhaps twenty have been in constant use, but during this period I have had only one disc which went faulty, fortunately with no programs on the affected tracks — that's not a bad record considering the hammering some of them have received. The disc in question developed a fault across three tracks (on one side only, as with yours) and did not clear with reformatting (again as yours).

It is possible to examine the magnetic surfaces of a disc, after opening the protective shutter by sliding the lever on the side of the case. The disc can be rotated by the central boss while viewing the surface, looking for any marks — DO NOT TOUCH THE MAGNETIC SURFACE! Due to the actual physical position of the disc drive head in the computer (under the disc when inserted), the side to examine is on the opposite side to numbering on the label.

On examining my faulty disc, I found a concentric scratch extending halfway round the disc's surface. The disc drive head has a slightly domed, extremely smooth, operating surface which could not have caused the scratch, nor could it have been caused by exposing the surface during handling because of its length. So I reckon that it must have been caused by something abrasive entering the case and proceeding to mark the surface the next time the disc was run.

Whether the fault is temporary or permanent, all may not be lost. It is often possible to recover some of the disc's contents using a sector editor, providing the disc hasn't been reformatted. Physical damage to discs should be localised to an area of the disc's magnetic surface, while magnetic corruption of the temporary kind may be localised too.

Using a sector editor, readable sectors can be transferred to a blank disc one at a time, by reading from the corrupted disc, inserting the blank disc and saving the sector again; however, this is very laborious with lots of disc swaps involved. Unfortunately it may be the only way to recover some of the files on the disc.

Of course, the fault my lie with your disc drive, either with the position of the head (which you shouldn't try to alter) or with faulty electronics or connections. In the case of the latter, it would be worth checking that any plugs or connectors, to or from the disc drive, are well pushed home (push carefully, as some of the connections may be fragile!) With the case removed to do this, it will also be possible to ascertain whether there is some dirt or fluff which is interfering with; using a soft brush to remove any you find, taking care not to scratch anything, nor to bring anything metallic close to the head. Try inserting discs in the opened state, to check that both good and bad discs seat home to the same position.

If you can find nothing wrong with any of the discs, but still have problems with them, even after checking for dirt and loose connections, unfortunately it may be necessary to send the computer away to have the drive checked out.

'One small problem that I have found with your ROMSwitch program is that I cannot get it to work! I do not have a normal ROM board, instead I have got the full package on ROM from Brunning Software. This includes ROMDOS and approximately 260K. Should this cause a problem?'

Alan Haire
Limavady

Bob Taylor replies: I am not too sure what results you are getting: ROMs not being switched on, or ROMs not being switched off. I expect that it will be the former.

This ROM is divided into sixteen 16K 'ROMs', any one of which can be switched-in in place of the BASIC ROM at addresses from &C000 to &FFFF. The mechanism for the switching is to output the ROM's select address to another port. Because both the BASIC ROM and 'sideways ROMs' (as all other ROMs are called) usually contain machine code routines which are to be run, it is essential that a routine is not being run within a ROM when that ROM is switched out; this is taken care of by the Firmware.

Sideways ROMs can be described as either 'background' or 'foreground'. Most ROMs (eg AMSDOS, PROTEXT, MAXAM, ROMDOS etc) are of the background type. The computer's BASIC ROM is a foreground type, but there are very few other foreground ROMs available, as this type takes over the machine when its routines are being used. Practically, most routines which are in ROM, can achieve their aims as background ROMs, without needing the total control forced by a foreground ROM.

In the 6128, there are only sixteen ROM select addresses (numbered from 0 to 15) at which background ROMs can be fitted. The AMSDOS ROM is always fitted at position 7, leaving only fifteen free. Foreground ROMs can be fitted at any free select address up to 15, or if higher, contiguously only from 16 upwards.

The ROMSwitch was written in response to a request from a reader. In those days, I was unaware of any Foreground ROMs having been produced, and the reader's requirement was for background switching anyway. The Brunword ROM is almost certainly, partially or wholly, a foreground ROM (since there are only fifteen background addresses free) and this is the reason for the routine's non-operation with it.

The ROMSwitch works by firstly switching off all ROMs, background and foreground, and then switching on again only those listed in its parameters (always including the AMSDOS ROM). Whilst the Firmware has routines specifically for initialisation of background ROMs, there are none for foreground ones, and even if a foreground ROM's select address had been included in ROMSwitch's list of ROMs to turn on, these would have been ignored by the background ROM initialisation routine at &BCCE which the program uses.

Foreground ROMs operate in a totally different way. On entering a foreground ROM routine, it completely takes over the machine, resetting all background ROMs to off (ie undoing any initialisation which ROMSwitch may have performed), and then switching on only those it requires. When exiting the foreground program, its routine may or may not restore the status of all the ROMs prior to entry — it depends on whether the program thinks it necessary.

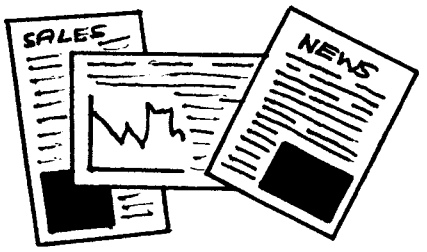
I expect that using the ROMSwitch with the Brunword ROM will result in AMSDOS and any other background ROMs specified in the RSX's parameter list being okay, but Brunword will be unavailable. This may be an advantage if at any time you wish to turn it off, but not otherwise. The only recourse to retrieve Brunword after using ROMSwitch, is to reset the machine; there are no Firmware routines for re-initialising foreground ROMs.

Some of the ROMs within the Brunword ROM may be configured as background types, but it is difficult to identify which ones go with which select addresses, without the use of a monitor program. The following program should list all the background ROMs, but only give their select addresses and not the contents:

```
[F1] 10 'ROM SELECT Checker  by Bob Taylor
[32] 20 rom=0:FOR addr=&B8DA TO &B8F8 STEP 2
[FE] 30 IF PEEK(addr)<>0 OR PEEK(addr+1)<>0 THEN PRINT"ROM Select"rom
[53] 40 rom=rom+1:NEXT
```

To identify which ROM is at which select address, ROMSwitch could then be used, switching on one ROM at a time from the list the above program gives, and checking which RSXs are still available.

If you have a computing problem that you would like answered, we still guarantee to answer all your queries, providing we receive your letter before the 15th August 1992.



News & Views

What's in a name...?

First off, an apology. In the PD round-up in Issue Twelve, we mentioned a PD library, **Yorkie PD**, which is run by Daniel Tuck. The only problem with this, is that it's not! The library is actually owned and run by Daniel YORK (hence Yorkie PD!) I blame it on a shortage of caffeine-injections that night! Sorry about that Daniel — I'm sure I can count on all the readers out there to write to Yorkie and order a disc or two to cheer him up. Each selection costs you 50p plus a disc, and you can contact Yorkie PD at: *11 Beechwood Avenue, St Albans, Herts AL1 4XP.*

Free CPM software

I recently received a letter from **Paul Fairman** in which he explained about his service to CPC users. Contact Paul at: *39 Woodlands Road, Barry, South Wales CF4 6EF.* Here's his letter which will give you some idea of what he's offering:

'I would like to bring to the attention of your readers a disc that I have set up with CPM Plus software for the CPC 6128 containing the best PD word processor around. VDE is the name of a full-featured, powerful word processor which is the best software in the PD, and is certainly better than some commercial stuff.

I have just set up a disc with VDE on, including a 7000 word fully expandible spell checking dictionary with spell checker program plus the dictionary editor, which runs under CPM also. The program was not written specifically for the CPC and, as such, modifications need to be made, but I have done all the necessary ones.

The disc includes a .DOC file written by myself with full details of how to set up the word processing system, and the good thing is that I am offering this disc to CPC users free of charge! The full instruction file by the author is also supplied.

Just a 3 inch disc and a SAE will get users the full disc. The reason why you have to set up the disc is because I cannot supply programs such as SUBMIT and SETKEYS on the disc as these are copyright, but all the software on this disc is public domain. Those wanting printed notes instead of the .DOC file will have to enclose 20p for three A4 sheets of printed paper.'

DATA-exchange

The popular **DATA PD** library is due for a shake up after the 1st July as its current owner and founder, Tony Kingsmill, has decided to try his hand at running something for his Commodore Amiga. After this date, the new librarian will be Simon Walker, who currently edits the Amster's Cage on the Silicon Village comms network. If you want more details on the future of Data PD, then his address is *Lightcliffe, Station Hill, Wigton, Cumbria CA7 9BW.* The library will continue to be run by Tony until the 1st July, and you can write to him at: *202 Park Street Lane, Park Street, St Albans, Herts AL2 2AQ.*

TUCK PD is born...

Following last issue's look at the PD libraries around (at least all those that answered our enquiries), we received some information on a library which has been running since late 1991, namely **Tuck PD**. At present, all the software is available only on disc, although Matthew Tuck (the owner) is considering a tape section as well. For a new library, they have a relatively large number of discs and each selection (two sides) costs £1.00 if you send a blank disc. If you want a catalogue disc, then send a disc, a SAE and just 10p. Alternatively, to get hold of a copy of Tuck PD's stocklist, or for more details, send a SAE to: *Tuck PD, c/o Matthew Tuck, 15 Ravencar Road, Eckington, Sheffield S31 9GL.*

Matthew also offers advice on all aspects of computing, and will be very willing to try and answer any queries or problems that you may have. We have yet to see any of the actual software, but the library appears to be run in a professional manner.

DARTSMA problems

DARTSMA PD has been experiencing difficulties in getting its latest catalogue printed, and the owner, Adam Shade, has asked if we could print an apology to all Dartsma customers who have sent a SAE or a disc. Adam hopes to have sorted out the problems by now, and will be dispatching all orders soon. His address is *47 Kidd Place, Charlton, London SE7 8HF.*

The end of PLAYMATES...

Its a sad day all round as Carl Surry of **PLAYMATES** has decided that enough is enough. Issue Twelve of Playmates, due out on the 1st June will the last issue that is produced. However, Carl has decided to try and produce a Bonzo News Sheet once or twice a year. Like Tony Kingsmill, he has decided to upgrade (?) to an Amiga and so is selling off most of his CPC software to make room for the new computer — so you may be able to pick up a bargain! Carl also has around 30 copies of Issues 8, 9 and 10 which he is selling for just 70p each. For more details, write to *Carl Surry, 37 Fairfield Way, Barnet, Hertfordshire EN5 2BQ.*

RINGING IN THE CHANGES...

It's all change at **CPC DOMAIN** as well. Since 15th May, Simon Warford has taken over the ownership and running of the disc magazine, which currently claims to have over 200 subscribers. The previous owner, Alan Scully, is still selling his own programs — such as PageMaker Deluxe and Label Designer — but is no longer involved with the magazine.

At the time of writing the details are a bit muddled and we don't have all the information regarding the future of CPC Domain and the Scull Software Library. Anyway, here are the facts as best we can ascertain:

- For ordering PageMaker Deluxe, Alan Scully's new address is: *PO Box 435, Glasgow G12 8SG*
- Any correspondence concerning subscriptions, sample issues or further information on CPC Domain, should be addressed to: *John Fairlie, 20 Montague Road, Saltford, Bristol, Avon BS18 3LA.*
- The editor of CPC Domain is Simon Warford and his address is: *134 Draper House, Hampton Street, London SE1 6SY.*
- Last time we heard, each issue of CPC Domain costs £1.25 plus a blank disc and a SAE; a four issue subscription costs £5.00 plus a blank disc and a SAE — the blank disc must be returned after every issue, ready for copying the next issue.
- The Scull Software Library was run by Graeme Chesser, but we do not know exactly what the situation is with the library in the light of these changes. Further details will be printed in future issues of CPC Domain.

A magnetic personality?

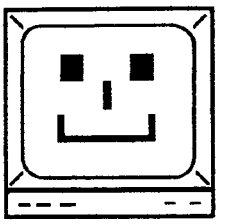
CPC MAGNETIC USER is the name of a proposed disc fanzine, which will be run by Mark Riley, with the assistance of James Verity from CPC Network. Details have yet to be finalised but from what we've heard, it sounds as though it will be aimed mainly at the serious user with a few games reviews thrown in to balance things up. The whole disc fanzine sounds as though it is going to be very well programmed and set up, and they hope to have a demo disc ready within the next month or so. To find out more about this venture, send an SAE to the following address, and when prices and so on have been sorted out, they will get back to you: *CPC Magnetic User, 2 Primrose Way, Kirby Muxloe, Leicester LE9 9AX.*

Other news from James Verity concerns CPC Network's **Tearaway and SuperWimp** programs — for the next month only, each of these programs will cost £7.50 if you send a disc along. Write to: *3 The Cottons, Wisbech, Cambs PE14 8TL.*

The French Connection

In the interests of European unity, I felt I better balance the article on the CPC in Germany with news of a free French fanzine called **'Les P.A.'** It is produced by Olivier Dejaegère who resides at *Club Amstrad 59, 24 Rue Henri Ghesquières, 59155 Faches-Thumesnil, France.* As my French is hopeless, I can't tell you much about the fanzine except that the pictures seem to suggest that it is aimed mainly at games players.

THE PRINT-OUT TEAM



Thomas Defoe — The Editor

I've owned my Amstrad since 1988 and have recently purchased an Apple Macintosh (in order to try it out, I've produced this issue on it). My interest in computing started when a friend bought a ZX81; my first experience of programming came when I learnt BASIC on the BBC Micro — I never actually owned a BBC, but read the computing books in the local library and wrote programs on pieces of paper to try out on my school's computer. I was first introduced to an Apple Mac when I was twelve and, shortly after this, bought my 464.

As anyone who has written a magazine will tell you, there are many times when you miss deadline after deadline, and the pile of unanswered letters grows steadily; but there is also the wonderful moment when you finally see 250 brown envelopes disappear down the road in a Royal Mail van! I think this might be a good moment to mention the man at the local post office who has had to put up with me over the past three years — I'm not going to forget the look on his face when I arrived a couple of days before Christmas with 200 envelopes, all of which had to be weighed separately!!

What can I tell you about myself? Not much really. I am currently studying Maths, Physics and Economics for A-Level in the Sixth Form of a local school. I will probably go to university in a couple of years and study some form of engineering. My other major interest apart from computing is motor racing, especially Formula One — as I write, the season has got off to an excellent start, so I'll leave it up to you to decide which team I support. Although I no longer study English, it is one of my ambitions to write a 'proper' book, and the Firmware Guide is a first step.

Although the magazine has been a bit of struggle at times (especially last year when I was taking my GCSEs) I've actually enjoyed producing it and have met so many CPC users who I would never have heard of otherwise. It's been great fun, but I'd advise anyone who is thinking of starting up their own fanzine to think again — you'll need hours to spare and an infinite supply of patience (which, as Mark will testify, I haven't got!).

For those people who asked for a picture of the editorial team in the magazine — sorry, no way! If you really want to see what I look like, try and get hold of the second issue of a business magazine called 'ComputerLand' and there is a full-page colour photo of me when I was thirteen, hunched over an Apple Mac, producing my school magazine — you see I've been in the publishing business for a long time!!!

Mark Gearing — Assistant Editor

I am taking my A-levels — French, German and English — at Bishop's Stortford College with aim of going to university to study law afterwards. Outside the world of Print-Out, I am interested in the theatre, European literature, music of all sorts (classical, jazz), water-skiing and boating. My main interest with Print-Out lies in the reviewing of the software, the general layout of the magazine and its distribution. Apart from Print-Out, my use of computers is mainly at school where I run word-processing and desktop publishing software to help with my studies. Over the last few years it has been both fascinating and rewarding to have some contact with other computer enthusiasts and I have enjoyed reviewing all the readers' efforts in my stint as Homebrew editor !!!

Writing letters in French and German to Amstrad users on the Continent was certainly good practice for my A-level exams and I hope that Print-Out broadened its coverage of the CPC and enlightened me to foreign interest in computers and their fanzines.

My introduction to computers was back in 1984 when I was given a BBC Microcomputer which I learnt BASIC programming on. Since then it has become redundant and I hope to purchase an Apple Macintosh in the near future (finances permitting!) but at the time of writing I am busy learning my Highway Code as my test is in less than a week's time!

Bob Taylor — My Computer

Technology: pre-microprocessor, pre-integrated circuit, pre-transistor (pre-war in fact)

Operating system: after initial BIOS development period, installed as electronic circuit trouble-shooter; recently acquired utilities for software development, being compatible with Sinclair ZX81 and Spectrum, and currently Amstrad CPC 6128; about to further enhance these by acquiring 386DX PC conformity

Internal memory: vast amount of neural network arranged as permanent Ram-disc, with multiple partitions and directories; being of the older variety, not as fast as current models, but mainly organised over 54 years into large database with very rapid, but quirky, retrieval of information; no facilities for direct addition of external memory, but can be simulated by scanning external hard copy etc, using optical input devices (see below)

External storage media: originally having access to 10 and 7 inch hard discs (shellac), and then progressing through paper and plastic tape (reel to reel), 12 inch semi-floppy discs and compact cassette tape to hard compact discs; programs stored are mainly classical: Haydn, Beethoven, Vivaldi etc

Input devices: have wide-spectrum aural and visual input capabilities for verbal, written and graphical recognition; also possessing olfactory (contact or air-borne) and tactile input sensors; no mice — the cat sees to that!

Output devices: chiefly oral, but have single channel calligraphy and deci-digital keyboard facilities

Languages installed: BASIC, English, Z80 machine code; no Artificial Intelligence (no lisp either)

Additional utilities: automatic, but limited, word processor; spread-sheets only when I have to

Most-used programs: computing, music

Multi-media: TV, radio, newspapers, magazines

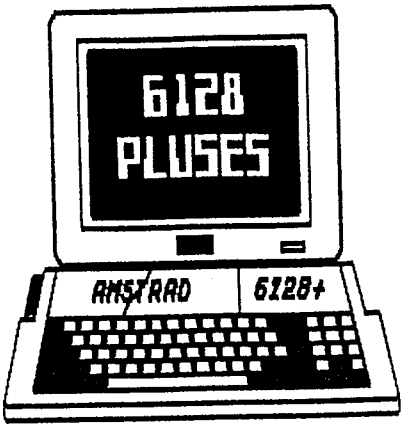
Clock speed: 70 per minute normal, 200 peak

Co-processor: wife — Hazel

Internal drives: obsession, stubbornness

Hard disc: third cervical vertebra (my wife's actually)

Ports: never touch it!

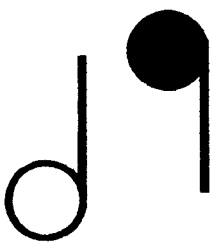


Drivers available: car, motorcycle

Further developments: two second generation, one third generation (all girls)

Future: Due for replacement in 2002 officially, but may 'retire' earlier if lucky; and will probably then be occupied with re-running old programs

Thomas Rehac Bob Taylor Mark Gearing



SOUND

An introduction to the CPC's sound chip

PART 5

To round off our look at the CPCs' sound commands, printed below there is a program which allows you to experiment with new sounds, and to try out volume and tone envelopes.

Unfortunately this series has had to be curtailed, and it was not possible to look at all of the commands and ways in which the CPCs' quite complex sound features can be utilised. The only advice that I can give for any budding computer musicians is to read your manuals, look at other people's programs, and experiment!

```
10 MODE 2:INK 1,0:INK 0,26:PEN 1:PAPER 0:BORDER 7:CLS
20 WINDOW #0,2,79,2,18:WINDOW #1,2,79,20,24:PAPER #1,1:CLS #1
30 MOVE 0,0:DRAW 0,399,1:DRAW 639,399:DRAW 639,0:DRAW 0,0:MOVE 0,110:DRAW 639,110
40 LOCATE 25,1:PRINT "The Print-Out Sound Generator"
50 LOCATE 2,4:PRINT "Please enter the tone period of the note (0 to 4095): ";
60 limit=4:GOSUB 810:IF num<0 OR num>4095 THEN GOSUB 990:GOTO 60 ELSE pitch=num
70 LOCATE 2,6:PRINT "Please type the duration of the note (-32768 to 32767): ";
80 limit=5:GOSUB 810:IF num<-32768 OR num>32767 THEN GOSUB 990:GOTO 80 ELSE dur=num
90 IF PEEK(6)=&80 THEN mvol=7 ELSE mvol=15
100 LOCATE 2,8:PRINT "Please enter the starting volume (0 to";mvol;CHR$(8);"): ";
110 limit=2:GOSUB 810:IF num<0 OR num>mvol THEN GOSUB 990:GOTO 110 ELSE vol=num
120 LOCATE 2,10:PRINT "Do you wish to have include a volume envelope (Y/N): ";
130 a$=UPPER$(INKEY$):IF a$="" THEN 130
140 vole=0:IF a$="Y" THEN vole=1 ELSE IF a$<>"N" THEN 130
150 PRINT a$
160 LOCATE 2,12:PRINT "Do you wish to have include a tone envelope (Y/N): ";
170 a$=UPPER$(INKEY$):IF a$="" THEN 170
180 tone=0:IF a$="Y" THEN tone=1 ELSE IF a$<>"N" THEN 170
190 PRINT a$
200 LOCATE 2,14:PRINT "Please select a noise to be applied (0 to 15): ";
210 limit=2:GOSUB 810:IF num<0 OR num>15 THEN GOSUB 990:GOTO 210 ELSE noise=num
220 LOCATE 20,16:PRINT "IS THIS INFORMATION CORRECT (Y/N) ?"
230 a$=UPPER$(INKEY$):IF a$="" THEN 230
240 IF a$="N" THEN RUN ELSE IF a$<>"Y" THEN 230
250 IF vole=0 THEN GOTO 440
260 CLS:WINDOW #2,2,79,7,17:LOCATE 25,1:PRINT "The Print-Out Sound Generator"
270 LOCATE 1,4:PRINT "DEFINING THE VOLUME ENVELOPE:"
280 LOCATE 2,6:PRINT "Please enter the number of sections (1 to 5): ";
290 a$=INKEY$:IF a$="" THEN 290
300 know$="12345":where=INSTR(know$,a$):IF where=0 THEN 290
310 vsec=VAL(a$):PRINT a$
320 FOR i=1 TO vsec
330 LOCATE 1,8:PRINT "PARAMETERS FOR SECTION";i
340 LOCATE 2,10:PRINT "Please enter the number of steps (0 to 127): ";
350 limit=3:GOSUB 810:IF num<0 OR num>127 THEN GOSUB 990:GOTO 350 ELSE vstep(i)=num
360 LOCATE 2,12:PRINT "Please enter the size of each step (-128 to 127): ";
370 limit=3:GOSUB 810:IF num<-128 OR num>127 THEN GOSUB 990:GOTO 370 ELSE vsize(i)=num
380 LOCATE 2,14:PRINT "Please enter the pause time of each step (0 to 255): ";
390 limit=3:GOSUB 810:IF num<0 OR num>255 THEN GOSUB 990:GOTO 390 ELSE vpause(i)=num
400 LOCATE 20,16:PRINT "IS THIS INFORMATION CORRECT (Y/N) ?"
410 a$=UPPER$(INKEY$):IF a$="" THEN 410
420 IF a$="N" THEN CLS #2:GOTO 330 ELSE IF a$<>"Y" THEN 410
```

```
430 CLS #2:NEXT i
440 IF tone=0 THEN GOTO 640
450 CLS:WINDOW #2,2,79,7,17:LOCATE 25,1:PRINT "The Print-Out Sound Generator"
460 LOCATE 1,4:PRINT "DEFINING THE TONE ENVELOPE:"
470 LOCATE 2,6:PRINT "Please enter the number of sections (1 to 5): ";
480 a$=INKEY$:IF a$="" THEN 480
490 know$="12345":where=INSTR(know$,a$)
500 IF where=0 THEN 480
510 tsec=VAL(a$):PRINT a$
520 FOR i=1 TO tsec
530 LOCATE 1,8:PRINT "PARAMETERS FOR SECTION";i
540 LOCATE 2,10:PRINT "Please enter the number of steps (0 to 239): ";
550 limit=3:GOSUB 810:IF num<0 OR num>239 THEN GOSUB 990:GOTO 550 ELSE tstep(i)=num
560 LOCATE 2,12:PRINT "Please enter the size of each step (-128 to 127): ";
570 limit=3:GOSUB 810:IF num<-128 OR num>127 THEN GOSUB 990:GOTO 570 ELSE tsize(i)=num
580 LOCATE 2,14:PRINT "Please enter the pause time of each step (0 to 255): ";
590 limit=3:GOSUB 810:IF num<0 OR num>255 THEN GOSUB 990:GOTO 590 ELSE tpause(i)=num
600 LOCATE 20,16:PRINT "IS THIS INFORMATION CORRECT (Y/N) ?"
610 a$=UPPER$(INKEY$):IF a$="" THEN 610
620 IF a$="N" THEN CLS #2:GOTO 530 ELSE IF a$<>"Y" THEN 610
630 CLS #2:NEXT i
640 CLS:LOCATE 25,1:PRINT "The Print-Out Sound Generator"
650 LOCATE 2,4:PRINT "The sound that has been entered is defined as:"
660 LOCATE 4,6:PRINT "SOUND 1,"pitch","dur","vol","vole","tone","noise
670 IF vole=0 THEN 690 ELSE PRINT "   ENV 1";
680 FOR i=1 TO vsec:PRINT ","vstep(i)","vsize(i)","vpause(i);:NEXT
690 IF tone=0 THEN 710 ELSE PRINT "   ENT 1";
700 FOR i=1 TO tsec:PRINT ","tstep(i)","tsize(i)","tpause(i);:NEXT
710 LOCATE 20,10:PRINT "IS THIS INFORMATION CORRECT (Y/N) ?"
720 a$=UPPER$(INKEY$):IF a$="" THEN 720
730 IF a$="N" THEN RUN ELSE IF a$<>"Y" THEN 720
740 IF vole=0 THEN 760
750 ENV 1,vstep(1),vsize(1),vpause(1),vstep(2),vsize(2),vpause(2),vstep(3),vsize(3),vpa
use(3),vstep(4),vsize(4),vpause(4),vstep(5),vsize(5),vpause(5)
760 IF tone=0 THEN 780
770 ENT 1,tstep(1),tsize(1),tpause(1),tstep(2),tsize(2),tpause(2),tstep(3),tsize(3),tpa
use(3),tstep(4),tsize(4),tpause(4),tstep(5),tsize(5),tpause(5)
780 SOUND 1,pitch,dur,vol,vole,tone,noise
790 LOCATE 25,16:PRINT "PRESS ANY KEY TO CONTINUE"
800 a$=INKEY$:IF a$="" THEN 800 ELSE RUN
810 entry$="":length=0:sign=0
820 a$=INKEY$:IF a$="" THEN 820
830 IF a$=CHR$(127) THEN GOTO 920
840 IF a$=CHR$(13) THEN GOTO 980
850 know$="1234567890-+":where=INSTR(know$,a$)
860 IF where=0 THEN 820
870 IF where=11 OR where=12 THEN GOTO 900
880 IF length<limit THEN entry$=entry$+a$:length=length+1 ELSE GOTO 820
890 PRINT a$;:GOTO 820
900 IF sign=0 AND length=0 THEN entry$=a$:sign=1 ELSE GOTO 820
910 PRINT a$;:GOTO 820
920 b=LEN(entry$)
930 IF b=0 THEN 820
940 IF b=1 AND sign=1 THEN sign=0
950 length=length-1:IF length<0 THEN length=0
960 c$=LEFT$(entry$,b-1):entry$=c$
970 PRINT CHR$(8);" ";CHR$(8);:GOTO 820
980 c$=entry$:num=VAL(c$):IF num=0 AND c$<>"0" THEN PRINT "0";:RETURN ELSE RETURN
990 b=LEN(entry$):IF sign=1 THEN b=b+1
1000 FOR i=1 TO b:PRINT CHR$(8);" ";CHR$(8);:NEXT
1010 IF sign=1 THEN PRINT CHR$(9);:RETURN ELSE RETURN
```

CPM DISC FORMATS

At heart CPM believes it is reading from and writing to IBM 8" discs. A Disc Parameter Block holds the actual specifications of the discs in use and data is converted to and from IBM 8" format during each read or write operation.

This approach avoided the need to bring out a new version every time a new disc format was invented and also made it much easier to use discs formatted on other machines. Locomotive Software added to these facilities by including an Extended Disc Parameter Block in the Amstrad implementation which, among other things, includes a 'freeze flag'. If this is set, it tells CPM to check the disc format every time and not assume the disc is standard format.

Sectors and Tracks

All Amstrad CPM discs have either 40 or 80 tracks in nine sectors, each sector holding 512 bytes. So a single-sided single-density disc holds 40 x 9 x 512 bytes or 180K; a double-sided double-density disc holds 80 x 9 x 512 bytes (or 360K) per side, so making 720K in all.

Of this at least 2K is required for the disc directory, hence the 178K available under AMSDOS. However, when CPM is loaded, the computer has to be given the initial instructions to look for CPM on the disc. These are held in the first sector of the first track of a system disc.

In CPM 2.2 the first two tracks also hold the routines which are normally loaded into the program area and overwritten when other programs are running so a system disc has to remain in drive A in order to enable CPM to restart at the conclusion of a program. In CPM 3.1, these routines are stored in banked RAM and called from there when necessary. So a system disc need only be used once to load CPM 3.1. For compatibility, the space which CPM 2.2 uses in the first two tracks of a system disc is empty on a CPM 3.1 system disc. The tracks holding the disc directory then follow the system tracks.

While data format discs (those without system tracks) can only be used with AMSDOS or in drive B with CPM 2.2, they can be used in any drive with CPM 3.1 once it has been loaded.

Amstrad supplied two other formats with the CPC — vendor and IBM. Vendor is a system disc with the first two tracks empty; since ICPM causes the computer to read the first sector of the disc in drive A, games programmers can put their own start-up routines in this sector. IBM format was included with CPM 2.2 to allow CPM programs to be ported from other CPM machines; it is no longer supplied.

Alternative formats

To make it easy to identify a disc, each format starts with a different sector number — system format starts with sector number &41, data format with &C1, etc. KDS used exactly the same technique with ROMDOS so that, when ROMDOS reads a disc in drive B, it determines the format from the number of the first sector. This also works with PCW single-sided discs since they start with &01! So ROMDOS can tell whether a disc in drive A is a system, data or PCW format disc.

Alternative formats for the 6128 have to satisfy the needs of AMSDOS, CPM 2.2, and CPM 3.1. The AMSDOS parameters are held in ROM so a way of bypassing and replacing them has to be found; the CPM 2.2 parameters are held on disc so that disc file has to be changed; the CPM 3.1 parameters are also held on disc and can be changed on disc, but they can also be changed after they have been loaded into banked RAM any number of times without upsetting CPM 3.1! Anyone wanting to experiment with different disc formats will find Alan Potter's brief example in the April 1988 edition of Personal Computer World, of how to enable a CPC to read PCW format discs, helpful. Other sources of useful information are the CPM Plus Handbook published by Heinemann, and the Amstrad CPM Plus published by MML Systems.

Disc formats under CPM 3.1

With the introduction of password protection and date/time stamping of files in CPM 3.1, changes had to be made to the CPM 2.2 format disc directories. To retain compatibility, a separate program (INITDIR.COM) was supplied which reformats the directory of a CPM 2.2 format disc so that every fourth directory entry holds the passwords and date/time stamps of the previous three entries. Since neither AMSDOS nor CPM 2.2 can understand what is going on in every fourth directory, it is absolutely vital not to use discs reformatted by INITDIR.COM with AMSDOS or CPM 2.2 — the price could be a corrupt disc directory! And, if you do not need passwords and date/time stamps, you can carry on using CPM 2.2 format discs, as created by DISCKIT, with CPM 3.1.

Problems with CPM

Two limitations of CPM need to be borne in mind. Firstly, CPM keeps track of files on disc by recording in the disc directory the blocks of space they use but each directory entry can only keep track of a certain number of blocks; longer files use additional directory entries to record the additional blocks so you can run out of directory space on a disc with less than the maximum number of files on the disc. The total number of blocks a disc directory can record is also limited; so, whereas the lower capacity CPC formats have 'standard' 1K blocks, the higher capacity RAMDOS formats use 2K blocks and, for example, a hard disc might use 4K blocks. So a 5K file would take 5 blocks (or 5K) on a CPC, three blocks (or 6K) on a RAMDOS format disc, and two blocks (or 8K) on a hard disc. Discs with many short files can carry a lot of empty space!

Secondly, CPM can only handle 128 directory entries at a time. So if you choose a RAMDOS format, or use a PCW 720K disc which has 256 entries, CPM will only display the first 128. It can still use the rest but their names will not appear in the directory display. The answer is that you are expected to split your files between 'user areas' (or 'groups' as they are called in Locoscript) so that you never get near the 128 limit.

File Handling

CPM updates a file's directory entry in its own workspace and only updates the disc directory when it writes the changes to disc; to protect the unwary, CPM 2.2 stops you writing to a new disc unless you perform a 'warm boot' by entering CONTROL-C. CPM 3.1 allows you to change the disc and updates the disc directory whenever necessary; but it is always worth checking that the disc activity light is off, or waiting a few seconds, after a program has ended before removing a disc, in order to ensure that any changes the program may have made to the disc directory have been completed.

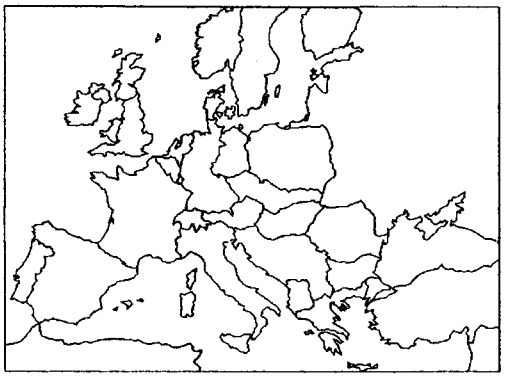
Erasing files under CPM

CPM 'deletes' files by changing the file's user number, normally between 0 and 15, to user number 229. Unerase programs bring back deleted files by changing the user number from 229 to whatever is the current user number. This needs to be done immediately as CPM treats 229 as an invitation to use any blocks allocated to the file for a new file. However, Locoscript on the PCW restricts users to groups (or user areas) from 0 to 7 and adds eight to the user number when files are deleted; these 'limbo' files can be recovered in just the same way as CPM deleted files — by restoring the old user numbers. But, as CPM recognises files in user areas 8 to 15 as genuine files, it will report 'Disc full' when Locoscript says there is space on disc, because it discounts all files in user areas from 8 to 15.

Though AMSDOS uses CPM 2.2 format discs, unlike CPM 2.2, it allows full access to user areas; so unerase programs have to be able to work in all user areas. As AMSDOS also uses 229 to indicate a deleted file, you can use an AMSDOS program to recover a file deleted by CPM on a CPM 2.2 format disc, even if you were using it with CPM 3.1. If you are using CPM 3.1 discs which have been reformatted with INITDIR.COM, you must use only a CPM 3.1 unerase program, such as that on Knife Plus from Hisoft.

'CPM 2.2 The Software Bus' by Clarke, Eaton and Pwys-Lybbe; published by Sigma (ISBN 0-905104-18-8)

'The Amstrad CPM Plus' by Powys-Lybbe and Clarke; published by MML Systems, 11 Sun Street, London EC2M 2PS (ISBN 1-869910-00-1)



THE CPC IN GERMANY

by Stefan Kuhs

Traditionally the CPC has always been strong in France, yet much of the best PD software comes from the land of BMW and Mercedes. This is very surprising when you consider the fact that there are relatively few CPCs in Germany; so we asked Stefan to tell us about the CPC scene over there. Readers of Carl Surry's Playmates may already know that I speak a bit of German, and so I can tell you that German demos, games, utilities and fanzines really are as good as Stefan makes out — Tom.

Magazines and Fanzines

Four years ago, there were many more CPC users in Germany than there are now. Most of the CPC users bought an Amiga or and Atari ST and because of the decrease in the number of users, the monthly magazine CPC MAGAZIN bit the dust and the popular CPC AMSTRAD INTERNATIONAL, which used to come out monthly, is now bi-monthly.

Three days ago I received the April and May issue of CPC International and I must say that this is really a bumper issue! For the programmers, there is an article about raster programming — rasters are something like coloured lines which cover the whole screen, even the border. If you've seen any good CPC demo you know what I mean. For the games fans, there are more than twenty games reviews. To tell the truth, some of the games are really old but there are reviews about new games too. I think CPC Amstrad International is more for people who do not want to play only games. The listings are really good. In fact, British PD libraries have got many programs which were printed in this magazine.

If you read the article about CPC Amstrad International in the February issue of Amstrad Action, then you should know that this article isn't up to date. They said that the magazine is for PC owners too, nut that is no longer true. The PC pages were thrown out so that the magazine is now for CPC and PCW owners only.

An issue of CPC Amstrad International costs 6 DM (about £2). There is no tape but you can buy something similar which is called 'Databox' and all the listings from the current magazine are on this tape or disc, plus a special 'bonus' program — the bonus program on the latest issue's tape and disc is called ZAPP'T BALLS from the famous Austrian demo and games coder, EGS (Elmsoft Game Service). This program is just like Pang on the Pluses, but it runs on the old CPCs with at least 128K of memory, and is even better! There's a two player mode and the scrolling is so smooth and fast you will not believe it. There are also excellent sounds while you are playing the game. Even if you never load any other program than Zapp't Balls on the cover tape, it is worth buying it. I think it is a must for all CPC users. The cover tape costs 20 DM (about £7) and the cover disc 30 DM (about £10) outside Germany. If you have trouble ordering it, then drop me a line and I'll help you. Even if you only know a little German it is worth subscribing to the magazine — a one year subscription (six issues) will cost 36 DM (about £12) in Germany. The address to write to for more details is: DMV Verlag, CPC Amstrad International, Postbox 250, W–3440 Eschwege, Germany.

One magazine which is just as important for German CPC users is the famous and fantastic COMPUTER FLOHMARKT. The mag is for all computers and games consoles and — believe it or not — contains about 10,000 Small Ads every issue!!! I think the German CPC scene wouldn't be able to survive without it; there are a lot of CPC columns in this magazine. All the Small Ads are free and you can send in as many as you like! If you want to know more about the CPC Flohmarkt then feel free to write to me. The mag costs 6 DM (£2) and is bi-monthly.

In this section I'm only going to mention the paper fanzines and not look at the disc magazines as well. There are three CPC paper fanzines in Germany at the moment.

The first published was CRACKERS INTERNATIONAL. But don't be confused by the title, CI is not only for crackers. CI was previously produced by KNS, WEEE!, Thriller and Killer. As you can see, pseudonyms are very popular in Germany, and I use one too. Most people don't know the real names and addresses of each other. After the sixth issue of CI, KNS stopped publishing the fanzines. After one and a half years, Thriller and WEEE! released the seventh issue of CI with games and demos reviews, and some scene news.

During this 18 month gap, Mike Behrendt published a fanzine called CPC POWER INTERNATIONAL. Well, like all German fanzines, this one contains games reviews, serious software reviews, demo reviews, pokes and cheats for games, and of course a lot of news.

After Issues Seven and Eight (a double issue), Mike stopped making the fanzine because he no longer had the time to do it. Because there weren't any CPC fanzines around, OAS (also known as OmegA Soft) who was a former writer for CPC Power International decided to start his own fanzine called CPC CHALLENGE. Now all three fanzines come out more or less regularly. In my opinion all the fanzines are really good, although the layout is not as good as in British CPC fanzines. But nobody cares about that in Germany!

User Groups and Clubs

There are three major CPC clubs in Germany and these are the 'Public Domain User Group', the 'Schneider/Amstrad CPC User Group' and the 'CPC User Group Wuppertal'. I don't know much about the PDUG and the SCUG, but the CPC User Group in Wuppertal has slightly over 100 members and publish a monthly fanzine called 'CPC Info'.

Piracy is a big problem in Germany, at least for the users — a lot of us have had trouble because of swapping illegal software (yes, you're right — me too!!!) PD was not very popular some years ago and even now most users think that there isn't any good PD software. But I think that PD will become more popular — there are some PD libraries around, such as the PDI and the libraries of Helmut Jungkunz, Martin Kotulla, J Fak, PDUG and Peter Brueker.

PD Libraries and Bulletin Boards

Every fanzine runs a PD or demo library. I notice that most British PD libraries hesitate to copy demos because of the copyright on the copied sounds and music. Well, the best library in the whole of Europe to get some good demos, slideshows or whatever is: K-OS of Beng!, Postfach 1112, W-7972 Usny, Germany

K-OS have got more than 1100 demos! Both sides of a disc full of demos of your choice costs 70p, but you must send your own disc. For the stocklist with all of the demos, disczines and other PD, send a blank disc and international reply coupon to K-OS (don't worry the lists are in English as well).

In Germany, a BBS is called a MAILBOX. There are some BBS which are of interest to CPC users. The most interesting may be the one of Mike Behrendt. So if you are a rich person, you can give him a call and his number is 02236/83007. I don't know the number from the UK, I'm afraid.

Other news from Germany

Thriller and WEEE! are coding a paint program called Mal Mit Mir (Paint with Me) with some special features. For example, you will be able to use the entire screen and use a lot more colours than normal.

Crown of Beng coded the best CPC filecopy program ever. Crime is its name, and Crime copies everything incredibly fast and, if you own a 128K machine, you can load more than 110K into the memory buffer. The program is very user-friendly — it is nearly impossible to change the source and destination discs over by mistake — and there is an automatic fast formatter; so if you try to save files to a unformatted disc, you'll be asked if you want to initialise the disc, and then the files will be saved. You're able to copy from any combination of A or B drives. Although this program is PD, all the PD libraries must first ask Crown if they're allowed to use it in their libraries. Dartsma PD is the first PD library which may use it, or you can get Crime direct from: Crown of Beng! Postbox 2828, W-6780 Pirmasens, Germany.

Do you know about the sound program Noisetracker Preview by MTI? This piece of software is very good but you can't create stand alone programs. MTI do not want to code the complete version of this program, but BSC and WEEE! want to code the rest of it — so you'll be able to use the sounds in your own programs.

Last summer, there was a large international CPC party at BMC (Black Mission Cracking). The visitors came from different European countries, and the editors of the famous French CPC magazine AMSTRAD 100% and the LOGON SYSTEM group were there!

Where to go from here...

If anybody wants to know more about the German CPC scene, or the addresses of some fanzines and clubs, or wants to swap demos, PD and news with me, then please write to:

Stefan Kuhs, Muensingerstr 35, W-7424 Heroldstatt-2, Germany

FASTER DISC DRIVES

by Bob Taylor

This short RSX routine can speed up disc loading and saving by between five and twenty per cent (depending on then number of track changes required in the process).

The syntax for the RSX is:

|FASTDISC	to speed things up
|FASTDISC, anything	to return to normal

The routine works by providing a block of data for the AMSDOS BIOS to set such things as motor on, motor off, head settle and write current off times. In operation, the most obvious effect of setting the disc drive faster will be the higher pitch of the stepper motor as it changes tracks, but longer files will take noticeably less time when loading and saving. The routine can be relocated elsewhere in memory by following the instructions printed in line 90; the command 'MEMORY a+&21' reclaims the bytes used by the relocator code routine, but may not always work on the 464.

The Listing

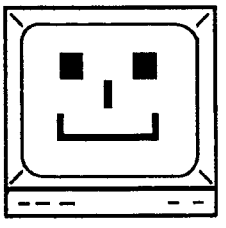
Just type in the listing below (save it before running):

```
[F1]  10 'FAST-DISC Loader  by Bob Taylor  (copyright 1992)
[6E]  20 MEMORY &7FFF:RESTORE:PRINT:PRINT"Please wait a few seconds ";
[28]  30 FOR lin=0 TO &58/8-1:total=0:FOR n=0 TO 7:READ a$
[A2]  40 byte=VAL("&"+a$):POKE &8000+lin*8+n,byte
[4B]  50 total=total+byte:NEXT n
[0D]  60 READ a$:IF VAL("&"+a$)<>total THEN PRINT:PRINT"Error in line"lin*10+110
         :PRINT:END
[94]  70 PRINT".";:NEXT lin
[C0]  80 PRINT:PRINT"All M/C loaded":PRINT:
         PRINT"Press S to save M/C as FASTD
         ISC.BIN":PRINT"or any other key to
         continue ":WHILE INKEY$="":WEND:IF
         INKEY(60)<>-1 THEN SAVE "FASTDISC.
         BIN",B,&8000,&5B
[AF]  90 PRINT:PRINT"To Load and Initialise
         |FASTDISC RSX just use:":PRINT"MEM
         ORY HIMEM-&5B:a=HIMEM+1:LOAD" CHR$
         (34)"FASTDISC.BIN" CHR$(34",a:CALL
         a+&22:MEMORY a+&21":PRINT"with the
         Disc inserted"
[EA] 100 END
[5E] 110 DATA 7E,23,E5,66,6F,19,7E,83,375
[D7] 120 DATA 77,23,7E,8A,77,E1,23,10,32D
[A3] 130 DATA EF,36,C9,23,01,08,00,C3,2DD
[F6] 140 DATA D1,BC,F3,FF,08,00,0B,00,392
[2F] 150 DATA 15,00,21,F8,FF,19,06,04,250
[CF] 160 DATA 18,D6,2D,00,21,18,00,B7,20B
[CA] 170 DATA 28,04,01,09,00,09,DF,2A,148
[C5] 180 DATA 00,C9,28,00,C8,00,AF,0F,277
[D2] 190 DATA 0A,01,03,32,00,FA,00,AF,1E9
[E3] 200 DATA 0F,0C,01,03,36,C0,07,46,162
[81] 210 DATA 41,53,54,44,49,53,C3,00,28B
```

Linechecker

A PROGRAM TYPING AID

All programs in Print-Out have Linechek codes which are enclosed in brackets at the start of a line. Don't enter them in as they're designed to be used with Linechecker to eliminate errors when typing in programs which appear in this magazine. Please note, all programs will run whether Linechecker is being used or not. For information on how to use Linechecker, please see Issue Three.



WACCI — the fanzine for serious users

12 Trafalgar Terrace, Long Eaton, Nottingham NG10 1GP — telephone (0602) 725108

The recently resurrected magazine is now being edited by The Management under the guidance of Clive Bellaby, and has quickly been restored to its position as the premier fanzine for the CPC and Plus computers. The main objective of the club is to provide help and advice to its members, and the magazine serves as the principal means of achieving this.

The club's financial troubles and near-demise have been widely reported in both the glossy magazines and the rest of the CPC world, and this interest is probably a reflection on the high regard in which WACCI is held. The club was originally founded by Jeff Walker (who many will know from his articles in older issues of ACU) and who now edits the Amiga fanzine, JAM. During the past couple of years, WACCI has been under the control of Steve Williams who expanded the club considerably. Over the past few years, I have seen several letters in the national magazines from a certain William Stevens, also from Twickenham, and I half suspect that this may well have been Steve's pseudonym — I'd be interested to hear from anyone who knows the answer for certain!

WACCI's greatest strength is the fact that it has members and contributors everywhere! They write software, design hardware, write articles for other magazines, run bulletin boards, contribute PD software, books, or information. If you combine this with the friendly atmosphere of the club, then you have an unbeatable package — the only slight criticism is that, despite all the user-friendliness, it can seem to be part of a different world for the newcomer as everyone already knows everyone else. I would recommend the magazine if only for the now infamous 'Simply Saffron' column...

For more information, write to Clive Bellaby at the above address, or give him a call. To obtain a sample copy of the magazine, send £1.50 to the same address. If you want an enjoyably serious magazine and club, then try WACCI!

Playmates — for all cheat mode addicts

run by Carl Surry, 37 Fairfield Way, Barnet, Herts EN5 2BQ.

Carl has been producing Playmates for a couple of years but sadly has decided that Issue Twelve (due out on 1st June) will be the last. The content of the magazine is aimed mainly at the gamesplayer, although the occasional serious article is included. A typical issue comprises about 20 games reviews, several pages of pokes and tips, plus news on fanzines, user groups and PD libraries. Other pages contain Carl's own comments on all kinds of topics (and not just related to computing either!) Playmates is a lively and friendly magazine, and its style reflects this; the articles are mixed with an assortment of clip-art, cartoons and other illustration. Playmates gives the impression that it's author enjoys writing and designing it — above all, it's fun to read!

Although this is going to be the last issue, Carl intends to try and produce a Bonzo News Sheet once or twice a year — no doubt, he'll be happy to supply you with further details if you send him an SAE. Issue Twelve of Playmates will cost £1.30 which includes postage and packing — there are still a few copies of Issues 8, 9 and 10 available at 70p each.

CPC DOMAIN — the guide to Public Domain

Details from John Fairlie, 20 Montague Road, Saltford, Bristol BS18 3LA.

CPC Domain is one of a number of CPC magazines that have undergone something of an identity crisis recently. The new team in charge are Simon Warford, the editor, and John Fairlie, the disc fanzine's administrator. Until recently, the magazine has been edited by Alan Scully and his influence is clear for all to see — there has been a strong bias towards PD programs in the Scull Software Library and plenty of space has been devoted to Alan's numerous pieces of homebrew software. Now that Alan is longer in charge at CPC Domain, we don't know what to expect from future issues.

In the past, CPC Domain has comprised two sides of a disc, which have been filled mainly with letters and PD reviews. There has also been the usual sprinkling of commercial software reviews, gossip and plenty of news from the CPC world. Of course, there are also a few bits of PD software on the disc, and screens showing off PD clip art, to brighten it up.

The problem with all disc fanzines, such as CPC Domain, is that the information does not come readily to hand; it is perfect for reading through, but it is not easy to locate a specific piece of information at a later date. The other failing with CPC Domain was the bug on a 464 that caused the program to fall over whenever it tried to raise memory — hopefully the new team will be able to find some way round this.

As we have only limited information about the style and content of future issues, we suggest you get in touch with John at the above address, and he should be able to give you further details on what to expect.

United Amstrad User Group — a genuine user group

Details from Tony Baker, 26 Uplands Crescent, Fareham, Hants PO16 7JY

Apart from WACCI, the United Amstrad User Group (UAUG) is the longest running CPC group and Issue 33 of the club magazine, CPC User, has recently been produced. The group is run by what can probably be best described as a committee of active members; at present, the editor is Steve Hayward and Tony Baker is the group's chairman — there are many more 'officers' and some of their names and addresses are printed below.

The group operates mainly through its bi-monthly magazine, which usually contains around 30 pages of A4. Unlike the other fanzines and groups mentioned in this article, CPC User tries to cover every area of CPC computing; from PD software, to games reviews, to tutorials. Considerable emphasis is placed on members' contributions, either in the form of letters or articles, and the UAUG organises a number of schemes to encourage members to meet each other, or to help solve problems. The group also runs a disc and tape PD library, as well as a comprehensive book library.

The UAUG is run for its readers and many of these services are only available to members; however with membership costing a mere £8.00 a year, it shouldn't break the bank. Linked to this, a number of major companies offer discounts to UAUG members, so it should be possible to recoup the membership fee through these special offers.

As I mentioned earlier, CPC User contains articles on just about everything under the sun. The following list should give you some idea of what you will be getting for your money: a news section, readers' letters, a number of BASIC and machine code tutorials, type-ins, games and serious software reviews, and an adventure column.

Whilst the UAUG probably isn't as well known as WACCI, it is still and excellent, and affordable, user group for people who want to do a bit of everything with their CPC. Further details about the group are available from Tony Baker (address above) and sample copies of CPC User can be obtained for £1.50 from Alan Stead at: 65 Wallisdean Avenue, Fareham, Hants PO14 1HS. Other UAUG officers who new members may wish to contact are:

Steve Hayward (Editor), 14 William Street, Bedworth, Warwickshire CV12 9DS.
Gordon Woolliscroft (Membership Secretary & PD Tape Library), 2 Wrenbeck Drive, Otley, West Yorks LS21 2BR.
Richard Sergeant (PD Disc Library), 67 Nursery Fields, Hythe, Kent CT21 4DS.

Amstrad CPC Information Group — a source of reference

run by John Ridge, 14 Walton Road, Woking, Surrey GU21 5DL

This recently formed group is intended to provide its members with a library of detailed information on all CPC computing topics. In order to collect as much information as possible, the Amstrad CPC Information Group has established a magazine entitled Amstrad Information Magazine (AIM).

The reasoning for the group's formation was that the organiser, John Ridge, felt that there was very little commercial support for the serious side of the CPC and so there was a need to provide users with information on any, and every, computing topic. Because helplines can provide information only on a one-to-one basis and some areas are too large to be covered over the telephone, the idea was to establish a library which would contain information that members had collected from various sources. When a member needs information on a particular topic, they can write in and receive a hardcopy of all the material that the group has on that subject — in this way, all of the details can be provided together, rather than being scattered throughout many articles in a magazine.

The purpose of AIM is to collate information from readers, and secondly to introduce people to the group and show them what is on offer. I have yet to see a copy of the magazine, but John tells me that Issue One is finished and Issue Two is well on the way to completion. This seems to be an extremely worthwhile project and one which it is in everyone's interests to support. For more information on the group and for membership fees, write to John at the address printed above.

Printed below are the names and addresses of some of the other CPC fanzines that exist. Unfortunately, none of these ones replied to our letters and so we cannot really comment on them:

A-OK — Matthew Harrodine, 155 Haslucks Green Road, Shirley, Solihull, West Midlands B90 2LG
a bi-monthly fanzine for serious users; costs £1.00 which includes postage and packing

Artificial Intelligence — Tim Blackbond, 19 Lee Street, Liversedge, West Yorkshire WF15 6DZ
another bi-monthly fanzine, but this time dedicated to PD software; costs 70p plus a SAE

WAIT A MINUTE...!

by Bob Taylor

An often used method of introducing a delay into a BASIC program is to set up a FOR-NEXT loop, with the control variable having to increment by approximately 1000 for each second of delay required. The RSX presented here allows accurate delays of up to three and a half minutes to be inserted and, unlike FOR-NEXT delays, these can be terminated early by a key press if desired.

The routine works by utilising the little used machine code instruction, HALT, which has the effect of holding up the operation of the microprocessor until an interrupt occurs. The interrupts happen every 1/300th of a second, so delays which are multiples of this can be instituted. In addition, forms of the RSX can be used to:

i) flush the keyboard buffer
ii) delay for the duration input, or until any or one specific key is pressed
iii) pause permanently until any or one specific key is pressed

The result of the RSX is determined by the parameters entered with it, and the various syntaxes are as follows:

|PAUSE	flush the keyboard buffer only
|PAUSE, 0	don't flush the buffer, but just await any key
|PAUSE, 0, ""	flush the buffer, then await any key
|PAUSE, 0, "key"	flush the buffer, then wait for the specified key
|PAUSE, delay	don't flush the buffer, but just wait for the 'delay' time
|PAUSE, delay, ""	flush the buffer, then wait for the 'delay' time or for any key
|PAUSE, delay, "key"	flush the buffer, then wait for the 'delay' time or for the specified key

The last two forms either run for the duration of the delay, or can be exited earlier by pressing either any key or the specified key respectively. The delays are given in 1/300th of a second, so a value of 300 will give a delay of one second, and so on. The 'key' which is entered should be a single character which will be case specific, so taking account of whether SHIFT or CONTROL is also pressed. Unfortunately, CPC 464 users will have to use the format:

```
a$="key":|PAUSE, @a$     or     a$="":|PAUSE, @a$      as usual
```

The RSXs can be used to provide delays for displaying information, either continuously or for a set period, which can be curtailed by pressing the nominated key condition. The ability to nominate a specific key to press can be used to only allow someone with knowledge of the 'password' key to proceed further. The routine can be relocated elsewhere in memory by following the instructions printed by line 90; the command 'MEMORY a+&1F' reclaims the bytes used by the relocator code routine, but may not always work on the CPC 464.

The Listing

Type in the following listing, and save it before running:

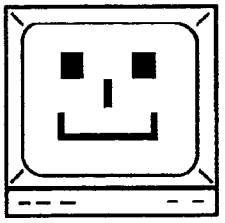
```
[F1]  10 'PAUSE Loader  by Bob Taylor  (copyright 1992)
[6E]  20 MEMORY &7FFF:RESTORE:PRINT:PRINT"Please wait a few seconds ";
[A8]  30 FOR lin=0 TO &A0/8-1:total=0:FOR n=0 TO 7:READ a$
[A2]  40 byte=VAL("&"+a$):POKE &8000+lin*8+n,byte
[4B]  50 total=total+byte:NEXT n
[0D]  60 READ a$:IF VAL("&"+a$)<>total THEN PRINT:PRINT"Error in line"lin*10+110
         :PRINT:END
[94]  70 PRINT".";:NEXT lin
[2D]  80 PRINT:PRINT"All M/C loaded":PRINT:PRINT"Press S to save M/C as PAUSE.
         BIN":PRINT"or any other key to continue":WHILE INKEY$="":WEND:IF INKEY
         (60)<>-1 THEN SAVE "PAUSE.BIN",B,&8000,&9A
[9D]  90 PRINT:PRINT "To Load and Initialise |PAUSE RSX just use:":PRINT "MEMORY
         HIMEM-&A0:a=HIMEM+1:LOAD"CHR$(34)"PAUSE.BIN"CHR$(34)",a:CALL a+20:
         MEMORY a+&1F":PRINT"with the Disc inserted"
[EA] 100 END
```

```
[5E] 110 DATA 7E,23,E5,66,6F,19,7E,83,375
[D7] 120 DATA 77,23,7E,8A,77,E1,23,10,32D
[A3] 130 DATA EF,36,C9,23,01,08,00,C3,2DD
[57] 140 DATA D1,BC,F5,FF,08,00,54,00,3DD
[C1] 150 DATA 21,FA,FF,19,06,03,18,D8,32C
[15] 160 DATA 74,00,FE,03,30,45,D6,01,2C1
[99] 170 DATA 28,17,F5,CD,09,BB,38,FB,3F8
[78] 180 DATA F1,D8,EB,DD,23,DD,23,7E,532
[E7] 190 DATA D6,01,38,05,23,5E,23,56,20E
[58] 200 DATA 1A,57,DD,66,01,DD,6E,00,300
[F3] 210 DATA 4C,0C,45,7C,B5,B2,20,01,2A1
[9B] 220 DATA 15,FB,76,7A,B7,28,0A,CD,3B6
[32] 230 DATA 09,BB,30,05,BA,C8,7A,3C,331
[FA] 240 DATA C8,7C,B5,28,ED,10,EB,0D,416
[99] 250 DATA 20,EB,C9,11,5F,00,1A,13,26E
[44] 260 DATA CD,5A,BB,B7,20,F8,C9,54,4CE
[56] 270 DATA 6F,6F,20,6D,61,6E,79,20,2D3
[9E] 280 DATA 70,61,72,61,6D,65,74,65,34F
[DD] 290 DATA 72,73,21,00,50,41,55,53,23F
[53] 300 DATA C5,00,00,00,00,00,00,00,0C5
```

Linechecker

A PROGRAM TYPING AID

All programs in Print-Out have Linecheck codes which are enclosed in brackets at the start of a line. Don't enter them in as they're designed to be used with Linechecker to eliminate errors when typing in programs which appear in this magazine. Please note, all programs will run whether Linechecker is being used or not. For information on how to use Linechecker, please see Issue Three.



SPECIAL READER OFFERS

Due to the success of our last Special Offers section, we are now offering the following second-hand products at a greatly reduced price. All pieces of hardware and software have been checked before being offered for sale, and all items are in excellent condition. If we are unable to supply an item, for whatever reason, we guarantee to refund your money in full.

Please send your orders to: Print-Out, 8 Maze Green Road, Bishop's Stortford, Hertfordshire CM23 2PJ.

STAR LC-10 COLOUR PRINTER PACK comprises: RRP £255.00 PRINT-OUT £150.00

Star LC-10 colour printer (with all original manuals)
CPC-Star printer ribbon
Two unused black printer ribbons and an assortment of used black and colour printer ribbons

The following issues of Amstrad Action and Amstrad Computer User are also for sale, at a cost of £1.00 an issue, which includes postage and packing. Those issues which include a covertape will be supplied complete with this tape.

ACU — Jan 1988 — Jan, Feb, Apr, May, June, Aug, Sep 1989 — Feb 1990
AA — 31,40,42,43,44,45,46,47,48,50,51,61,64,67,68,69,70,71,72,73,74

Budget games on tape (for just £1.00 each) — all are originals and include full instructions

Grand Prix Sim, Pro Ski Sim, BMX Sim, International Rugby Sim, Death Stalker, Super Hero, Advanced Pinball Sim, Super Robin Hood, Kwik Snax, Pro Skateboard Sim, Fighter Pilot, Chuckie Egg, Commando, Top Gun, Biggles, Antiriad, Grid Iron 2, Dizzy, Grand Prix Tennis, Batman (3D version), Dan Dare, Jet Set Willy, Metal Army, A Question of Sport, Fantasy World Dizzy, Cobra Force, Scooby Doo, Crazy Cars, Monty on the Run, Into the Eagle's Nest, Race Against Time, Super Star Soccer

Full price games on tape (for just £2.50 each) — all are originals and include full instructions

MatchDay 2, Leaderboard Par 3 (compilation), Supreme Challenge (compilation), Batman (The Caped Crusader), The Dark Side, The Bard's Tale, Football Manager 2, Lotus Esprit Turbo Challenge, Emlyn Hughes International Soccer, The Living Daylights

PRINT-OUT SMALL ADS

PRESTON ROS BBS — Is now on-line 24 hours a day, 7 days a week — on (0772) 652212. Speeds available are 300 - 1200/75 - 1200 - 2400. Protocol is 8 N 1 (scrolling). Preston Ros is a serious based bulletin board for users of Amstrad CPC/PCW ranges of computers. Please give it a call soon!

DISC SUITE — A comprehensive disc utility packed with loads of useful features, including a special ASCII helper plus free PD, if you mention Print-Out. Send £4.99 and disc to Adrian Sill, 19 Sherwood Drive, Skellow, Doncaster, South Yorkshire DN6 8NY.

FOR SALE — Computer games. Most budget tape games will cost 50p and disc games will cost £2.00. Some collections will be dearer but not by much. Write for details. Carl Surry, 37 Fairfield Way, Barnet, Herts EN5 2BQ.

PLAYMATES — Issue 11 out now at £1.30 including postage and packing. Playmates is a fanzine for all games players. Includes reviews, pokes and tips as well as Bonzo Meddler news. Limited number of back issues are still for sale at just 70p — write for more details. Also the final issue of Playmates will be out on 1st June. Contact Carl Surry, 37 Fairfield Way, Barnet, Herts EN5 2BQ.

PUBLIC DOMAIN — Any Public Domain, homegrown software, etc wanted. Any software sent to me by 2nd April will get a free 3.5 inch disc in return, as well as their disc back. Don't forget to enclose a SAE. Derek Hyland, Lissanly, Cloyne, Midleton, County Cork, Ireland.

FOR SALE — Protext £15, Advanced Art Studio £12, Mini Office 2 £10, GCSE French Test £5, Stop Press, mouse and mouse mat £30 (all on disc). Amstrad CPC 6128 plus colour monitor, tape recorder, £200 of magazines, £300 of software and accessories (recently serviced) will sell for £250. All the above in good condition. Contact J R Welch, Le Knells, Cooper's End, Takeley, near Bishop's Stortford, Herts CM22 6PT.

FOR SALE — Brunword Elite, Infoscript, Headline, Qualitas (printer fonts), 100 letters disc, printer port and lead suitable for 9 pin printers (eg DMP 2000/3160) has an RRP of over £150, and I am willing to sell for £65. 256K memory expansion £35; Protext, Prospell, Promerge, Utopia and four slot ROM board (with the ROMs in board), all instructions, etc £65; AMX Stop Press DTP for 6128, including mouse and some picture discs £40; Bonzo Doo Dah, Super Meddler, Blitz, Procopy, Maxidos, Flash Pack, Big Batch and all news letters and some other stuff £60; SuperCalc 2 (CPM) £16; 2-in-1 file transfer program (CPC-PC-CPC) £15; CPM ROMs plus instructions £20; KDS 8-bit printer port and printer lead (CPC-Centronics) £7; KDS 5.25 disc drive and ROMDOS (ROM, disc and ROM board) £70; loads of games on disc and tape, plus magazines from 1986 to 1990. Get in touch with: Phill Mackay, 12 Lydstep Road, Barry, South Glamorgan CF6 3EB, or phone (0446) 721289.

ADVENTURE PD — The PD library for adventurers (both beginners and experts). For a catalogue, write to: Adventure PD, Debby Howard, 10 Overton Road, Abbey Wood, London SE2 9SD.

DATA PD — Large CPC PD library. For a stocklist, or further details on prices, please write to: Data PD, Tony Kingsmill, 202 Park Street Lane, Park Street, St Albans, Herts AL2 2AQ.

The program tape or disc for Issue Twelve is now available at the usual price — as well as all the programs included in this issue of the magazine, they contain a program written by Mr M Graham of Dingwall, Scotland. This program is designed for a 464 with a disc drive (although it should be possible to modify it for use on a 6128) and serves as a handy library for the files on upto 20 discs. In addition, notes can be added and there are search options to help locate files. Details on how to order are included on the insert with this issue.

THE PRINT-OUT HELPLINE

RICHARD WILDEY — Help given on BASIC programming, tape-to-disc transfers and the DMP 2000 printer. Contact Richard at: 41 Enmore Gardens, East Sheen, London SW14 8RF.

TONY WALKER — Help given on Protext, Promerge Plus, Prospell, Utopia, Comms, CPM on ROM, ROMDOS (3.5" operating system), Star LC 24-10 printers, and CPM Plus Protext. Please write to Tony Walker at: 24 Ullswater Road, Fulwood, Preston, Lancashire PR2 4AT, or give him a call on (0772) 651698 — phone only between 10am and 10pm.

DICK HORNSBY — Help given on BASIC programming (at ordinary level) and possibly on using Arnor's external ROMs. Help sought on more advanced BASIC programming and machine code programming. Also exchange of serious programs etc, and joint working on programs of mutual interest to us both. You can write to me at 22 Holmwood Grove, Mill Hill, London NW7 3DT, or phone me on (081) 959 4779.

CHRIS — Help given on anything: no problem too small; also PD documents printed out, just send disc with DOC files on and I'll send the DOCs back printed out (3p per page, both sides) with your disc and a bill for postage. Okay! Write to: 6 Frank Street, Great Horton, Bradford BD7 3BT.

SEAN McMANUS — Help given on all aspects of BASIC and assembly language programming but don't forget the SAE!!! Get in touch at: 226 Chertsey Rise, Stevenage, Herts SG2 93Q.

ALAN SCULLY — Help offered on BASIC programming (fairly advanced), printers, all aspects of Public Domain, disc to disc copying and virtually everything else from hardware advice to finding a piece of software; I'm useless at CPM though! You can get in touch with me at: 119 Laurel Drive, East Kilbride, Glasgow G75 9JG.

SAM WRIGHT — I want to get in touch with anyone with ROM blowing or file copying experience. Write to: 24 Chester Avenue, Whitehead, Carrickfergus, County Antrim BT38 9QQ.

ROGER MEDLEY — I would like to know if anyone has a spare manual for the Canon PW1156A printer, or can photocopy some information from it; I need to know if it is OK to use it with a CPC 6128. Rev P R Medley, The Vicarage, Linkinhorne, Callington, Cornwall PL17 7LY.

BJØRNAR SÆTERNES — I would like to get in touch with other CPC users, in either Norway or abroad; I have a CPC 6128 so please write to: Bjørnar Sæternes, Ramstad, 7924 Austafjord, Norway.

STEFAN KUHS — If you're interested in the CPC in Germany, or want to swap demos, PD and news then write to me. Stefan Kuhs, Münsingerstraße 35, W-7424 Heroldstatt-2, Germany.

Mr A J HOWARD — Does anyone know of an Italian word processor and spellchecker for the CPC. If so, then please write to: 65 Altyre Way, Beckenham, Kent BR3 3ED.

ANGELA ALLUM — Help on Avon, Morden's Quest, Scapeghost, Kobyashu Naru, Hollywood Hijinx, Auf Wiedersehen Monty, Forest at the Worlds End, Jack the Nipper, Thing on Spring, from 22 Point Royal, Bracknell RG12 7HH (SAE)

Contrary to a small article in a recent issue of Amstrad Action, no-one is taking over the running of Print-Out after this issue. We received a number of enquiries from various people who were interested in continuing the magazine but, for one reason or another, we decided that this was not possible.

Instead, we'll continue to use the name Print-Out when referring to our business — at present the only product that we are actively marketing is The Firmware Guide and its associated software.

We will be taking orders for program discs and tapes until the 15th August. The Firmware Guide will continue to be available after that date. Many thanks for reading Print-Out in the past — we have had an excellent time producing the magazine, and now all that remains for us to say is goodbye and to wish you all the very best. *Tom, Mark and Bob., 1992.*